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New technology-based recruitment methods

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ABSTRACT

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The transformation that recruitment might encounter due to big data analytics and artificial intelligence (AI) is particularly fascinating which is why this thesis focuses on the changes recruitment processes are and will be facing as new technological solutions are emerging. The aim and main objective of this study is to widen knowledge about new technology-based recruitment methods, focusing on how they are utilized by Finnish recruitment professionals and how the opportunities and risks that these new technological solutions provide in recruitment processes are experienced. Also, the future prospects of technology-based recruitment are examined.

The use of technology in recruiting practices is constantly becoming more and more routine amongst organizations. Recruiting as a whole has experienced a major change with new technologies providing quick, effective and cost-efficient ways of finding potential employees. Among these new technologies are big data and AI. Organizations have been collecting massive amounts of data, and now they are able to derive real value from big data and AI.

The research data was collected during the spring of 2018 by interviewing eight Finnish recruitment professionals who work among recruitment on a daily basis. Data was studied with qualitative methods by analyzing, coding and identifying themes.

As the aim of this thesis was to widen knowledge about the phenomenon of new technology-based recruitment methods the findings of this study appeared broad and diverse, highlighting the novelty of the phenomenon as opinions of the interviewees varied greatly. In Finland, AI is already utilized in recruitment at least to some extent. Three phases where AI can be of use during the recruitment process were identified: practical organizing, pre-screening applications and candidate communication.

The benefits and disadvantages of AI in recruitment aroused much discussion and opinions among the interviewees. Numerous opportunities and risks were identified when utilizing new technologies in recruiting. Among other things, accelerating the recruitment process, automation of routine tasks and increasing objectivity were seen as opportunities. The risk of discrimination, data distortion and invasion of privacy were considered as risks, among others.

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Muutos, jonka rekrytointi on kohdannut ja tulee jatkossa kohtaamaan uusien teknologioiden myötä on erityisen mielenkiintoinen. Tämän vuoksi tutkielmassa keskitytään rekrytointiprosessissa jo tapahtuneisiin sekä tuleviin muutoksiin. Tämän tutkimuksen tavoitteena on syventää ymmärrystä uusista teknologiaperusteisia ratkaisuista rekrytoinnin tukena, keskittyen siihen, miten suomalaiset rekrytoinnin ammattilaiset hyödyntävät näitä uusia teknologioita sekä mitä mahdollisuuksia ja riskejä uudet teknologiaperusteiset ratkaisut tuovat mukanaan rekrytointiin. Lisäksi teknologiaperusteisten rekrytointityökalujen tulevaisuudennäkymiä tutkittiin.

Teknologioiden hyödyntäminen rekrytoinnissa on jatkuvasti arkipäiväisempää organisaatioiden keskuudessa. Rekrytointi kokonaisuutena on muuttunut merkittävästi uusien teknologioiden tarjotessa nopeita ja kustannustehokkaita tapoja löytää potentiaalisia työntekijöitä. Näiden uusien teknologioiden joukossa ovat big data sekä tekoäly. Organisaatiot ovat keränneet valtavia määriä dataa ja nyt he pystyvät saamaan reaalisia arvoja näistä suurista määristä dataa.

Materiaali tutkimusta varten kerättiin keväällä 2018 haastattelemalla kahdeksaa suomalaista rekrytointiammattilaista, jotka työskentelevät päivittäin rekrytoinnin parissa. Haastattelujen jälkeen materiaali analysointiin kvalitatiivista tutkimusmenetelmää hyödyntämällä. Materiaali analysoitiin, koodattiin ja jaettiin teemoihin.

Tämän tutkielman tavoitteena oli laajentaa tietämystä uusista teknologiaperusteisista rekrytointimenetelmistä. Tutkielman tulokset ilmentävät ilmiön uutuutta sekä monipuolisuutta. Haastatteluiden aikana kävi ilmi lukuisia mielipiteitä ja kokemuksia tekoälyn hyödyntämisestä rekrytoinnista. Suomessa tekoälyä käytetään rekrytoinnissa ainakin joissain määrin. Tutkimuksessa tunnistettiin kolme vaihetta, jossa tekoälyä voidaan hyödyntää rekrytointiprosessin aikana: käytännön organisoiminen, hakemusten esiseulonta sekä hakijaviestintä.

Tekoälyn aiheuttamat hyödyt ja haitat rekrytoinnissa herättivät myös paljon keskustelua haastateltavien keskuudessa. Lukuisia mahdollisuuksia ja riskejä, jotka syntyvät uusien teknologiaperusteisten rekrytointiratkaisujen hyödyntämisestä tunnistettiin. Muun muassa rekrytointiprosessin nopeuttaminen, rutiininomaisten tehtävien automatisoiminen sekä objektiivisuuden lisääminen nähtiin mahdollisuuksina. Syrjintä, datan vääristyminen sekä yksityisyyden loukkaaminen puolestaan nähtiin riskeinä.

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1 INTRODUCTION

1.1 How technology is changing the field of human resource management?

Our economy, society and culture have gone through some great changes with the development of technology (Ma & Ye, 2015, 71). These new technologies are affecting organizations daily and it is obvious that most of the areas of management have encountered the pressure of information technology, and so has human resource management (HRM) (Bondarouk & Brewster, 2016; 2662; Tohidi, 2011, 925). Rapid technological advances have provided new, intelligent and digital technologies to meet the challenges HRM is facing (Bondarouk & Brewster, 2016, 2652–2653). Numerous technological advances have emerged in the field of HRM, the largest influencing factor being the Internet (Panayotopoulou, Vakola & Galanaki, 2005, 279). Researchers Ulrich, Younger, Brockbank and Ulrich (2013, 457) have suggested the necessary need of change in HRM and the competencies required to be able to deal with the new ever-changing environment. If HRM wants to remain renewable, new technology-based solutions need to be considered so that HRM professionals can focus more on value-adding work and leaving manual routine job tasks to automation (Biro, 2016).

> *"If HR wants to continue to play a critical role in helping businesses anticipate and manage organizational change, it must have technology at its core." (Biro, 2016.)*

Traditionally, HRM has been characterized as a soft profession. However, HRM professionals require substantial IT skills to keep up with the quantitative complexity of the profession as recordkeeping and huge databases are a part of everyday life. (Townsend & Bennett, 2003, 361.) As new technologies, such as big data analytics and artificial intelligence (AI) are emerging, the HR department is forced to rethink their human resource needs. Many different terms such as digital HRM, eHRM, Big Data analytics, HR analytics, strategic HRM and human resources information system (HRIS) have arisen, all bringing their own contribution in the field of new technology-based recruitment methods or tools that promote efficient HRM and recruitment. (Ulrich, Younger, Brockbank & Ulrich, 2013, 457.) A consensus of the terminology and concepts referring to digital HRM among

scientists hasn't been achieved yet, but many characteristics have been identified (Zang & Ye, 2015, 42).

The effects of these new technologies on HRM professionals still remain unclear – will these new and effective technologies destroy or increase opportunities regarding work? (Bondarouk & Brewster, 2016, 2662.) Even though technologies provide great opportunities, threats are also posed. Naturally, new technologies tend to cause uncertainty among people, since they have an impact on people's everyday lives, both in leisure and work. When change occurs in organizations, usually individuals or groups tend to resist these changes, as sometimes the benefits for the organization might have a conflict with the interests of the employees who are asked to make a change (Oreg, 2003, 680). Rejecting conditions of change, uncertainty and risks are therefore reasonable characteristics for people and organizations (Michie, 2002). Technophobia (Brosnan, 2002) and anxiety (Beckers & Schmidt, 2001) are common issues people face when it comes to new technologies. However, these new technologies have come here to stay, making it vital for the HRM field to adapt to them. Technologies have had an impact on both the HRM field in general and its core activities like recruitment (Noe, Hollenbeck, Gerhart & Wright, 2003).

1.1.1 How recruitment is being transformed by technologies

Recruitment is an important part of HRM, as it is used to acquire one of the company's most important capital, intellectual capital. Recruitment includes all the organization's practices and activities of which main goal is to identify and attract potential employees. Especially today, it is essential that employers are able to attract the best applicants to the fullest possible extent, in order to have the best candidate pool of applicants to choose and make final recruitment decisions from, as the competition for the best candidates is tough. (Parry & Olivas-Lujan, 2011; Parry & Wilson, 2009, 655.) In addition, the length and nature of employment have changed over time (Ekonen, 2014, 30). Employee commitment is no longer self-evident, since the traditional understanding of a career and the role of an individual in an organization has changed (Riivari, 2009, 1). Recruiting and onboarding new employees are costly processes, which is why we need to pay attention to it. As employees are considered to be the company's most important asset, failure of recruitment naturally results in huge expenditures (McLean et al., 2015, 1).

Recruitment as an industry has changed massively from the beginning, the 1970s, when the industry first surfaced. Today, recruitment is increasingly challenging and competition for good employees has intensified. (Koivisto, 2004, 88.) Recruitment is also increasingly being outsourced to organizations specialized in recruitment and staffing (Taylor, 2010; Johnson, Wilding & Robson, 2012, 306). Recruitment of the most skilled workforce is, however, seen as a major concern for many companies and the recruitment process has become more complex every day, leading several companies to experience difficulties in the selection process (Bâra, Simonca, Belciu & Nedelcu, 2015, 3; McLean et al., 2015, 1). As social networks, information technology and infrastructure are constantly evolving, they are becoming more and more intertwined, making the recruitment process complex (Bâra et al., 2015, 3). Also, new technologies have led to major changes in recruitment, which is why thorough research on the phenomenon of new technology-based recruitment methods is needed, to understand its potential and risks. Despite these changes the recruitment process and its goal have remained quite similar; we are still looking for employees, collecting information and outlining the whole package. Also, the essential of looking for correspondence between the applicant and job description remains. (Markkanen, 1999, 16.)

Technological development has been rapid, which has naturally had an impact on the tools utilized in recruitment. As a result, this thesis is focusing on the changes recruitment processes have and will be facing as new technological solutions are emerging. Due to information technology and the Internet, job seekers can now electronically forward their applications on companies' websites (Dhamija, 2012). Since its inception, electronic recruitment became a success in the field of HR management (Galanaki, 2002). Online recruitment has brought considerable perks in terms of cost, time, candidate pool and quality of response in addition to the benefits technology provides in improving sorting and contacting candidates. (Panayotopoulou, Vakola & Galanaki, 2005, 279–280.)

> *"Job search can be compared to writing a love letter. If you don't get a response from the other party fast enough, the reaction is negative, and you no longer want to be in contact with that person. The same logic applies to recruitment." (Professional 2, 2018.)*

The discussion about how organizations can manage the huge masses of applications due to online recruitment sparked a debate as early as 1999 (Reingold, Baig, Armstrong & Zellner,

2000). Today, new solutions provided by technologies have been created to meet this challenge.

1.1.2 Big data and AI in recruitment

An extensive growth in data collection and management systems has occurred due to the arrival of new technologies (Searle, 2004, 337). The world is being transformed by big data, making it vital for organizations to deal with this radical change (Mayer-Schönberger & Cukier, 2013). The transformation that recruitment might encounter due to big data analytics and artificial intelligence (AI) is interesting and particularly fascinating. Big data is expected to strongly influence each organization and their operations today and, in the future (Scholz, 2017, 91). For now, big data might be considered as a technological phenomenon, but it will have a strong impact on a social level and the personnel within organizations - therefore, recruitment professionals have the chance to focus on people while observing and noticing the changes big data is bringing on (Scholz, 2017, 109).

High volumes, velocity and variety are distinct characteristics of the phenomenon of big data, which is defined as information assets that require specific technology and analytical methods for its transformation into value (De Mauro, Greco & Grimaldi, 2016, 122). Even though the future of big data analytics still remains unclear, job roles and skills constituting this area are most likely to be changed. (De Mauro, Greco, Grimaldi & Ritala, 2017, 1–2; 9–10.) Today, big data is being used by organizations for example, in recruitment, since they claim that the subjective nature of people is hindering their business whereas, big data is contemplated to be less biased (Scholz, 2017, 162). Digital means of analyzing data help make decision-making more objective, which is virtually impossible with traditional judgement and decision-making including at least some degree of subjective perspective which can be useful in recruitment (Bondarouk & Brewster, 2016, 2660). Although big data is conceptualized as objective by eliminating people's subjective instincts, the subjectivity of big data must also be taken into consideration for various reasons. As anticipated even big data contains errors, blind spots and subjectivity through algorithms constructed by people. (Scholz, 2017, 162.)

New technological solutions provide a quick way of searching and analyzing huge amounts of search data using algorithms, making the criterion no longer just a keyword but a

complete concept, which can support the recruitment process (McLean, Stakim, Timner & Lyon, 2015, 1–2). To train these algorithms we need massive amounts of data (Jordan & Mitchell, 2015, 256). Today, to an increasing extent it is important not only for organizations but also individuals, like professional recruiters, to understand and learn from big data (Christozov & Toleva-Stoimenova, 2015, 157).

> *"Today's technology gives HR professionals access to the power of Big Data. Analytics also allow recruiters to assess potential employees based on real information; by basing hiring decisions on facts instead of hunches, they can improve the quality and placement of new hires." (Biro, 2016.)*

The amount of big data that organizations have collected is huge and this data growth continues to skyrocket without the end of sight. In order to gain and maximize value from the data organizations are collecting, more and more has to be done with amount of data being created. And this is when organizations need artificial intelligence (AI). For human beings our intelligence is so significant that we call ourselves '*Homo sapiens'* (wise man). The field of AI pursues to understand and build intelligent entities. (Stuart & Norvig, 2016, 1.) So it is obvious that organizations are able to derive real value from big data, also in recruitment. AI has broken through to provide great potential for the techniques utilized in HRM, like recruitment (Strohmeier & Piazza, 2015, 150). AI techniques can be utilized for example in data mining techniques in employee selection, employee development and employee recruiting with information extraction that automates the process of résumé identification and extraction of relevant information (Chien & Chen, 2008, 282; Giotopoulos, Alexakos, Beligiannis & Likothanassis, 2005, 233; Kaczmarek, Kowalkiewicz & Piskorski, 2005, 4).

The use of AI in recruitment has attracted interest according to a National Recruitment survey conducted by Duunitori (2017), where 18 % of respondents replied that the rise of AI in recruitment is the most interesting trend in recruitment in year 2017. AI was the third most interesting trend among the respondents. Also, 67 % of the respondents perceived that the number of recruitments will increase in 2017, indicating that recruitment will retain its position as one of the main areas of HR. The survey was targeted at Finnish recruitment and HR professionals and a total of 188 people responded. It is clear that big data and AI have

raised the interest of Finnish professional recruiters, which is why the phenomenon needs to be studied more closely.

AI helps to keep pace with the data growth and "*adds an intelligence layer to big data to tackle complex analytical tasks much faster than humans could ever hope to*" (Forbes, 2014). Therefore, big data and AI need each other in order to maximize value in a much bigger scale (Provost & Fawcett, 2013, 59).

> *"Artificial intelligence or AI, has become pervasive in business in every industry where decision making is being fundamentally transformed by Thinking Machines. The need for faster and smarter decisions and the management of big data that can make the difference is what is driving this trend. The convergence of big data with AI is inevitable as the automation of smarter decision-making is the next evolution of big data." (Canton, 2016).*

Capturing data in order to, for example identify trends or patterns in employee behaviors, is useful if the meaning is extracted. AI can be used to extract this meaning, determine better outcomes and enable faster decisions from big data, which can also be useful in recruitment. (Kaczmarek, Kowalkiewicz & Piskorski, 2005, 4; Faliagka et al., 2012, 216–220).

> *"In a world where there is big data everywhere, the extraction of meaning, the monetization of data for a purpose will be driven by AI." (Canton, 2016).*

Research on technology-based recruitment methods is far behind the current practice and must be researched more widely in the future, taking into account the new technologies that provide great opportunities for flexibility and access (Searle, 2006, 346). There is a huge gap in the literature of new technology-based recruitment methods that must be filled, in order to provide better guidance for recruitment professionals (Marler & Fisher, 2013, 35). The research of technology-based recruitment methods remains limited, which is why a more in-depth understanding is crucial. Researching new technological solutions as part of the recruitment process is important since no comprehensive scientific research about the subject has been done yet, although the use of technologies has already become very common and are a part of recruitment professional's everyday life.

1.2 Purpose of the thesis

The aim of this study is to understand how new technology-based recruitment tools are utilized in recruitment. In addition, the question of how the opportunities and risks that new technology solutions create in recruitment processes are experienced by Finnish recruitment professionals is examined. Also, the future prospects of technology-based recruitment is investigated. This study focuses on the organization's point of view leaving out the perspectives of individuals and society. It is necessary to understand the organization's point of view on this phenomenon, as organizations will most likely transform the future of recruitment through their actions. Organizations often seek to continuously enhance their operations and these new technology-based recruitment tools may alter the work of recruitment professionals by providing more cost-effective ways to work.

The research questions are:

1. How are new technology-based solutions utilized in recruitment processes?
2. What kind of opportunities and risks do new technology solutions generate in recruitment processes?
3. What are the future prospects of technology-based recruiting?

The research of technology-based recruitment methods remains limited, which is why a more in-depth understanding has been added through empirical research (Chapman & Webster, 2003, 113). Research data is collected by interviewing Finnish recruitment professionals who utilize new technological solutions in the recruitment process. This thesis applies a qualitative research method. The qualitative research method enables to study the phenomenon as comprehensively as possible. For this reason, the thesis draws on a qualitative research approach that seeks to find in-depth answers that help to widen knowledge about the phenomenon. The research material is collected through interviewing Finnish recruitment professionals who take advantage of new technological solutions in recruitment processes on a daily basis. The material collected during the interviews will guide the course of the study (Hirsjärvi, Remes & Sajavaara, 2009, 160–166.) The interviews are carried out with an open approach, allowing the interviewee to answer the questions using their own terms and expressions. The theoretical part will be shaped according to the themes that are raised in the interviews.

1.3 Key concepts

The use of technology in recruiting practices is constantly becoming more and more routine among organizations (Anderson, 2003, 130). Information technology can support the recruitment process (Markkanen, 2005, 17). *Technology-based recruitment* refers to the tools utilized in recruitment. Recruiting as a whole has experienced a major change with new technologies providing quick, effective and cost-efficient ways of finding potential employees (Searle, 2004, 336; Jones, Brasher and Huff, 2002). Information technology has brought new vocabulary in to the HRM debate - the traditional discourse has been supplemented with new terms referring to technology like electronic HRM and big data analytics (Bondarouk & Brewster, 2016, 2655).

An extensive growth in data collection and management systems has occurred due to the arrival of new technologies (Searle, 2004, 337). High volumes, velocity and variety are distinct characteristics of the phenomenon of *big data*, which is defined as data sets that require specific technology and analytical methods for its transformation into value (De Mauro, Greco & Grimaldi, 2016, 122). Big data refers to massive data sets that are so large and complex that it can't be analyzed by using traditional applications. New applications have been built to analyze big data (Bâra et al., 2015, 4–5).

Information, technology, methods and impact have been recognized as essential characteristics and components for comprehending the meaning of big data analytics (De Mauro et al., 2017, 4). A consensus among researchers about the concept of big data has not been achieved yet. However, five adjectives have been identified that describe big data. These adjectives are massive, high growth, diversification, a new approach and a more convincing result. In addition, four basic features, the four V characteristics: volume, variety, velocity and value have been classified. Volume refers to the quantity of generated and stored data which is relatively large-scale. Variety means the type and nature of the data that is commonly complex. In this context, velocity means the speed in which data volume is growing and emerging every moment. Value or low value density describes the amount of useless or even wrong information due to the large scale of unstructured data. (Zang & Ye, 2015, 42.)

Artificial intelligence (AI) can be described as a number of different techniques that allow computers to execute tasks that would typically demand the reasoning skills of an intelligent human (Salin & Winston, 1992, 49). AI is a part of computer science focusing on machine learning, making computers act intelligently with the computers constantly improving their own expertise (Nilsson, 1980, 1). Computers may be able to acquire knowledge similarly as human beings (Valiant, 1984, 1134). Artificial intelligence can create data on their own concluding to a circle of learning (Scholz, 2017, 38).

There are several definitions of AI. Stuart and Norvig (2016, 2) have presented two approaches to AI. The *human-centered approach* involves observations and assumptions about human behavior, whereas the *rationalist approach* contains a combination of calculation and engineering. (Stuart & Norvig, 2016, 2–3.) In this research the rationalist approach is adopted where AI acts in the best possible way in a situation. This approach has been chosen because during a recruitment process it is necessary to treat all candidates as fairly and equally as possible.

1.4 The course of the study

The thesis is structured in the following way. First, to gain knowledge about the phenomenon previous literature and research are examined. Previous literature is expected to support the findings and recurring themes of the research material. The theoretical framework is built to describe recruitment as a whole and how new technologies can be utilized during the process. Before presenting the results and research material of this study, the research method is presented. This thesis utilizes a qualitative research method. Research results are presented based on the themes identified during the interviews. Finally, the summary and conclusion aim to compare previous literature to the research material and summarize the key findings of this research.

2 THEORETICAL FRAMEWORK

2.1 Recruitment as a part of HRM

The recruitment process is a vital part of HRM. Recruitment has significant strategic value since attracting and retaining high-quality talent produces opportunities to gain competitive advantage according to the resource-based view of HRM (Boxall & Purcell, 2003; Barney, 1991; Wright & McMahon, 1992; Barney & Wright, 1998). In addition to delivering talent, employees also bring knowledge, potential, contacts, networks and experience which can help organizations to achieve their goals (O'Meara & Petzall, 2013, 4). Recruitment and selection are seen as an important function for business success, which traditionally has been viewed as a course of action where an organization seeks to match the right individual with the right job (Markkanen, 2002, 7–9; Newell, 2005, 116). Organizational success nowadays is exceptionally dependent on attracting high-quality individuals who can keep up with the intensifying global competition and increasing customer expectations (Newell, 2005, 115; O'Meara & Petzall, 2013, 4). As job assignments are becoming more specialized organizations are forced to compete for the best resources, recruiting competent employees is of predominant importance and should not, therefore, be underestimated (Markkanen, 2005, 13; Newell, 2005, 115).

Recruitment and selection are strongly linked to the employer brand image, helping organizations hire the best people and also help in maintaining their position (Ambler & Barrow, 1996, 186). The employer brand image defines how attractive an organization is on the recruitment market and therefore largely determines how the applicant pool will look like (Valvisto, 2005, 21). Influencing the employer image refers to all the actions that an organization takes internally and externally in order to promote themselves as a desirable employer (Backhaus & Tikoo 2004, 501). The employer image is thought to work as a link between a potential job-seeker and an employer, making an attractive organization engage more attention amongst promising talent (Kauhanen 2009, 68–69; Markkanen, 2002, 110). During the recruitment process, organizations must consider how they want to communicate their own corporate culture and image as an employer; recruitment and implementation of the recruitment process strongly transmit the corporate image of the organization (Järvinen & Korosuo, 1990, 101).

2.2 Recruitment and Selection

Originally, the term recruitment originated from military activity in the form of recruitment events organized by military organizations (Markkanen, 1999, 11). For decades recruitment and selection decisions have been made based on feelings, reason and will without following any recruitment theories (Markkanen, 2002, 5). Before the Industrial Revolution almost no effort was spent on recruiting. Recruiting became more important as organizations grew bigger and more complicated. The need to analyze and describe jobs more accurately came with the introduction of industrialization as it was necessary to find the right individual for the job who fulfilled the requirements for the certain job. (Snow & Snell, 1993.)

F.W. Taylor (1911) was one of the earliest management writers who proposed a concept where individuals should be recruited based on their skills and abilities rather than the fact that they were first in line or happened to know someone (Newell, 2015, 115). The required skill set has shifted over the years as the labor market has evolved. Physical skills were crucial at the time of industrialism, soft and social skills during the growth of the service sector, personality traits, communication skills and technical skills in call centers and so on (Newell, 2015, 116; Crouch, Finegold & Sako, 1999; Redman & Matthews, 1998; Callaghan & Thompson, 2002, 239). According to Newell (2015, 115) even the most basic recruitment and selection procedures are not adopted by many organizations even by today. Kilibarba and Fonda (1997) also recognize this pattern and where able to find only little evidence that text book advice on recruitment is followed (Carroll et al., 1999, 237).

Recruitment and selection are categorized into two different processes. Recruitment, in general, can be defined as a process where the aim is to attract individuals and acquire job applications from individuals who meet person specifications that are crucial in order to successfully manage the job tasks portrayed in the job description. In turn, selection refers to the process in which differences between candidates are measured for the sake of finding and selecting the individual who best matches the person specification that is determined by the job description (Graham & Bennett, 1995, 177). (Newell, 2005, 116–117.) From now on, this study will focus on recruitment, leaving the selection process out.

2.3 Recruitment process

The recruitment process can be considered as a project which starts when the need for a new employee arises and ends with the recruitment decision (Breaugh, 2008, 104; Markkanen, 2002, 9). There are numerous definitions of recruitment processes, but they are often described as quite similar. The recruitment process consists of four stages: evaluation whether the position needs to be filled, a job analysis, establishing the job description and a person specification (Carroll, Marchington, Earnshaw & Taylor, 1999, 237). The entire end-to-end recruitment process contributes to whether an employer's recruitment activities objectives are accomplished and, therefore, more attention should be focused on the recruitment process itself (Breaugh & Starke, 2000, 407).

The recruitment process begins by establishing recruitment objectives such as which types of applicants are sought in terms of, for example, work experience and level of education. In Figure 1, a model of a recruitment process is presented. Some of the recruitment objectives involve pre-hire objectives (e.g. attracting certain types of individuals and filling certain number of job openings) and some objectives are post-hire by nature (e.g. recruiting individuals with certain retention rates and attracting individuals who will perform at a certain level). (Breaugh, 2008, 104–105.)

After establishing the recruitment objectives, a strategy for filling the open position is developed where questions regarding the recruitment objectives are addressed. After addressing the strategy-oriented questions listed in Figure 1. recruitment activities will be carried out. Recruitment activities include deciding the recruitment method that is implied by the recruitment strategy. After establishing the recruitment objectives, developing a recruitment strategy and determining the recruitment activities, it is important to evaluate the recruitment results and compare the results to the objectives (i.e. what was hoped to be accomplished vs. what was actually accomplished). By constantly analyzing the objectives in contrast to the results, organizations can learn from their experiences and be more effective in recruiting in the future. (Breaugh, 2008, 104–105.)

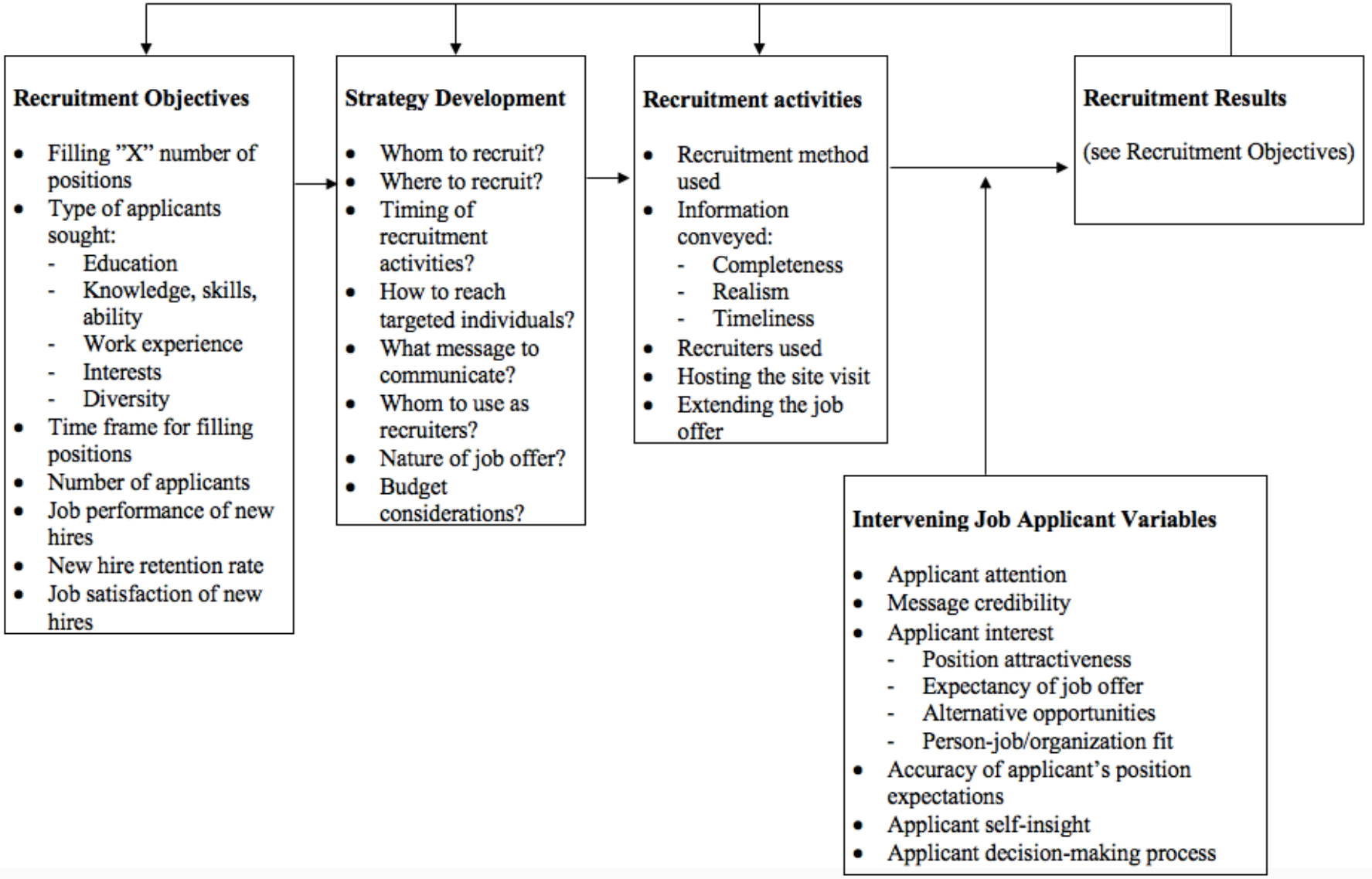

Figure 1. A model of the recruitment process (Breaugh et al., 2008, 104).

In addition to the previously mentioned stages of the recruitment process, the 'Intervening Job Applicant Variables' labelled box in Figure 1. should play a fundamental role in the course of planning the recruitment process, since these job applicant variables have a significant impact on the successfulness of the recruitment. Common recruitment methods such as newspaper advertisements will not be effective when trying to attract the attention of individuals who are currently not looking for employment; therefore, paying attention on the job applicant variables matters notably. (Breaugh, 2008, 105.)

2.4 Recruitment methods

Recruitment processes and practices can vary in several ways depending on their formality, subtlety and cost (Marsden & Campbell, 1990). There is a distinction between formal recruitment methods, where a job-seeker uses an impersonal mediator service between themselves and potential employers, such as advertisements in journals or on the Internet, and more informal recruitment methods, where in turn current employees or other people spread information about job openings through interpersonal channels – including recommendations and headhunting (Granovetter, 1974, 11; Marsden & Gorman, 2001, 468; Behtoui, 2008, 412; Marsden, 1994; 981). The recruitment process can be carried out by the means of internal promotion or external recruitment. Organizations can utilize either internal or external ways to recruit new talent, and also have the option to use both internal and external recruitment. (Granovetter, 1974.)

2.4.1 Internal promotion

In internal promotion, the resources to fill the vacancy are sought from an organizations existing workforce. Internal resources can also refer to employee referrals, former employees and previous applicants (Sarma, 2008, 90). In order for internal promotion to succeed, an organization must identify the existing human capital. Employee referrals is seen as one of the oldest sources of recruitment, which is a cost-effective way of recruiting (Rashmi, 2010, 36). Matching candidates with open vacancies is easier while being aware of the candidate's skill set, qualifications, behavior and work experiences (Rao, 2009, 104).

In addition to being a quicker and less expensive way of recruiting, internal promotion presents its own advantages. Internal promotion is seen to offer a more reliable way to recruit employees when compared to external recruiting, since knowledge about the present employee is more detailed in comparison to an external candidate. Taking advantage of internal resources provides numerous advantages such as better exploitation of employees, increased motivation amongst employees, due to capabilities being considered and opportunities offered for promotion and promoting loyalty. (Patel & Rana, 2007, 41.) However, internal promotion also has its drawbacks. The existing workforce offers only a limited candidate pool, leaving out potential external candidates with fresh ideas and new perspectives (Rashmi, 2010, 26).

2.4.2 External recruitment

External recruitment refers to a situation where the resources to fill a vacancy are brought from outside the organization. External recruitment might be more expensive and time-consuming than internal promotion, but naturally external recruitment offers a more extensive pool of applicants. (Patel & Rana, 2007, 41.) Numerous sources such as job advertisements, campus recruitment, recruiting firms, job portals, job fairs and headhunting offer excellent ways to bring talent to organizations (Arthur, 2005, 35; 38; 41; Rao, 2009, 102; Rashmi, 2010, 35; Patel & Rana, 2007, 43).

The use of head hunting is based on the idea that the best candidates are not those who are currently looking for new jobs and apply for jobs but those who are successful in their current jobs and are not interested in shifting jobs. The head hunting consultant seeks for potential candidates from competing organizations, newspapers, various industry publications in addition to secret headhunting networks. (Graham & Bennett, 1995, 179).

External recruitment agencies can be used to recruit talent when it comes to pursuing access to expertise and saving the organization's time and resources. In addition to the aforementioned aspects, the organization's decision to utilize recruitment agencies is due to the aspiration to focus on the most essential stage of the recruitment process, that is to say, decision-making. The recruitment process is often carried out partly or in full by the recruitment agency. (Korosuo & Järvinen, 1992, 96–98.) Focus on external recruitment has been chosen in this thesis, leaving out internal recruitment methods.

2.4.3 Formal and informal recruitment methods

There is a distinction between formal recruitment methods, where a job-seeker uses an impersonal mediator service between themselves and potential employers, such as advertisements in journals or on the Internet, and more informal recruitment methods, where in turn current employees or other people spread information about job openings through interpersonal channels – including recommendations and headhunting (Granovetter 1974, 11; Marsden & Gorman, 2001, 468; Behtoui, 2008, 412; Marsden, 1994; 981).

Both formal and informal recruitment methods have their own advantages and disadvantages based on their characteristics. Formal recruitment methods are characterized by extensive information distribution which naturally comes along with a hefty price tag. In addition to the larger costs. Formal methods usually require considerable screening activities, since the applicant pool is usually large and rather undifferentiated. Formal recruitment methods provide organizations with an opportunity of reaching all potential employees, and therefore attaining a heterogeneous applicant pool. Formal recruitment methods are poor at attracting the attention of people who are not actively looking for jobs, for which it may not be the most effective method (Breaugh, 2008, 105). (Marsden, 1994, 981.)

Informal recruitment methods have their own disadvantages since current employees tend to attract candidates that are similar to themselves, therefore attracting a homogeneous applicant pool and missing opportunities to attract heterogeneous qualified applicants. Applicant pools are naturally more limited when using the informal recruitment methods. (Marsden, 1994, 981.)

Early literature on recruitment methods has concentrated on the use of traditional recruitment methods such as newspaper advertisements, but there has been a shift towards more contemporary recruitment methods (Breaugh, 2008, 103). The Internet transformed the recruitment scene from the mid-1990s when it first emerged as a recruitment tool (Boydell, 2002; Parry & Tyson, 2008, 257).

2.5 The impact of technology on recruitment

As competition for talent and recruiting talents is a challenging part of the competition between organizations, recruiting talents is the main task of the HR department (Kapur & McHale, 2005; Singh & Finn, 2003, 396). Information technology has come to provide support during the recruitment process (Markkanen, 2005, 17). During the recruitment process, by utilizing advanced technologies, organizations can identify the most suitable individual for the job by taking into account the availability and qualifications of the potential employee (Bondarouk & Brewster, 2016, 2660). Information technology provides a broader platform, the internet, for recruitment work, where organizations can gather resume and application information on a daily basis, even when there is no need for recruitment. By combining information from social networking sites and recruitment, HR will find more information about the candidates leading to more accurate person-post matching. (Zang & Ye, 2015, 42–44.)

It has been said that in a traditional recruitment process, HR professionals fail to acquire extensive information about candidates. Also, in a traditional recruitment process, the interviewer carries a crucial role. In addition, information that the candidate shares are often one-sided and at times even false, leading to biased results. Today, there are solutions to solve these problems – technology and digital means of analyzing data that help make decision-making more objective, which is virtually impossible with traditional judgement and decision-making including at least some degree of subjective perspective (Bondarouk & Brewster, 2016, 2660). Making use of data in organizational decision-making, in other words, data-driven decision-making is argued to lead to better organizational performance (Tomassen, 2016, 3). Intelligent digital HRM can provide reliable data in situations where traditional assessment of information can lead to controversial subjective opinions (Bondarouk & Brewster, 2016, 2660). Data can provide objective information that eliminates these subjective distortions from decision-making (Bondarouk & Brewster, 2016, 2660).

New technologies have also influenced the automation of the routine tasks of the recruitment process. Jobs and routine tasks are being automated because it is less expensive new technologies to perform them than humans (Nilsson, 2005, 73). An increasing share of

work will become susceptible to automation as machines are taking on intellectual tasks that once were referred to non-routine tasks that required the human brain. Defining a routine job task that is susceptible for automation is not static, which means that in the future more and more jobs will shift from the non-routine column to the routine column, becoming susceptible to automation and leaving time for more creative and non-routine occupations. (Ford, 2013, 37–39.)

2.5.1 Online recruitment

Numerous technological advances have emerged in the field of HRM, the largest influencing factor being the Internet. Due to technology job seekers can now electronically forward their applications on companies' websites. A lot of routine work on recruiting has been reduced as a result of electronic recruitment (Dhamija, 2012). Since its inception, electronic recruitment became a success in the field of HR management (Galanaki, 2002). Organizations have turned to IT methods to enhance their recruitment functions, since it has had a substantial affect in increasing the speed and efficiency of recruitment (Singh & Finn, 2005, 398–401).

Online recruitment has brought considerable perks in terms of cost, time, candidate pool and quality of response in addition to the benefits technology provides in improving sorting and contacting candidates. Electronic recruitment is not just about receiving job applications electronically but is considered to include several different recruitment areas. In general, online recruitment is considered to include the publication of jobs on the Internet, receiving electronic applications and use of electronic recruitment tools, such as various types of resume- and application banks, recruitment robots and portals constructed to help recruiters. (Panayotopoulou, Vakola & Galanaki, 2005, 279–280.)

The discussion about how organizations can manage the huge masses of applications due to online recruitment sparked a debate as early as 1999 (Reingold, Baig, Armstrong & Zellner, 2000). Today, new solutions provided by technologies have been created to meet this challenge. Processing large amounts of applicants is burdensome and for this reason, many organizations have created electronic pre-screening systems that sort out applications for example based on keywords (Viitala, 2007, 112–113).

Utilizing technologies in recruitment processes has become common amongst large organizations in particular (Anderson, 2003, 130). Innovations in techniques underpinning psychometrics and new media have changed recruitment processes making the process quicker, more effective and cost-efficient (Searle, 2006, 336–337). New technologies provide advantages in means of gathering information from multiple sources and managing the volume, storage, indexation and access. Especially the recruitment process is considered to be an area where tools of surveillance are perceived as attractive for employers. (Searle, 2006, 337–338.)

Searle (2006, 339) reviews three essential processes of selection and recruitment: attraction, search and assessment. In this context, surveillance includes the development and application of tools and techniques which allow collection of personal applicant data. An organization can attract employees by using direct and indirect methods. There has been a movement from traditional paper-based recruitment brochures to recruitment job boards, that allow organizations vacancies more visibility and in turn, applicants have a wider range of vacancies to choose from. The internet has enabled applicants to gather information about organizations, in addition to providing simulations and work fit questionnaires that supply realistic job previews and clue about organizational-fit. (Searle, 2006, 339–340.)

During the search process, it is most often necessary for organizations to seek for applicants. Previously this required gathering applicants by rehiring previous employees or hiring headhunters to do the search process on behalf of the organization. The internet provides a new approach to recruitment by facilitating communication and interaction, hence easing access to potential applicants. Message systems and active search processes have potential for rapid conversation and in addition, identifying potential applicants who are not actively searching for new jobs. These processes have their flaws since they involve unintended ways of using information, which may conclude to an invasion of privacy. (Searle, 2006, 340.)

When considering applications and assessment, new technology and approaches, both providing a potential for surveillance, have influenced the existing methods thoroughly. Online applications have altered the process of identifying candidates drastically. Also, the role of skill and ability assessment has changed since there is no need for purchasing

personality tests from third parties since the internet can be used to screen users and enhance the validity of tests. In the era of the internet, applicants are able to participate more in the recruitment process and raise opportunities for those from economically disadvantaged countries and regions (Baron & Austin, 2000). (Searle, 2006, 342–345.)

In Figure 2, the most significant ways in which new technologies have influenced the essential processes of selection and attraction are summarized. New technologies have significantly increased visibility and ease of job search, for both organizations and job seekers.

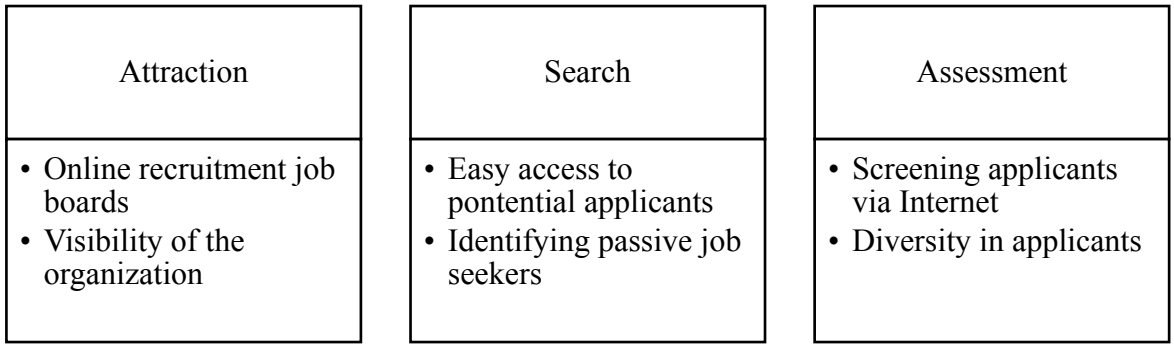

Figure 2. Essential processes of recruitment and selection (Searle, 2006, 342–345).

2.5.2 Big Data Analytics in recruitment

Technologies that are capable of organizing and processing large amounts of heterogeneous and unstructured data are in exponential growth (Bâra et al., 2015, 3). HR related big data is a radical change that is emerging in the HR department (McCormick & Andrews, 2016, 2). By using intelligent methods and analyzing big data, organizations can create a competitive advantage in recruitment, leading to business development (Bâra et al., 2015, 3). The most evident feature of big data is volume, which is constantly produced by people using smart devices that are connected to the network (Bâra et al., 2015, 4–5). The number of data increases each minute, which encourages data to be exploited and stored. Modern technology enables efficient data storage and large data queries, focusing on the use of data as a whole and not only the use of samples (Bâra et al., 2015, 4–5). Big data walks hand in hand with analytics, because the ultimate purpose of collecting data is to process and analyze it in order to get the information needed for the organization which is also called value (Bâra et al., 2015, 4–5).

Big data analytics focuses on analysis for intelligent decision-making. According to Scholz (2017, 75) big data is able to free resources from operational tasks, which can be automated in the HR department and leave time for strategic work. To succeed in the exploitation of big data, HR-departments need to improve big data literacy, literacy meaning the ability to learn from data (Christozov & Toleva-Stoimenova, 2015, 157). Without understanding the basics of data, how to use it and how to protect it, its implementation in recruitment is likely to fail. Therefore, D'Ignazio and Bhargava introduce the concept of data literacy as follows:

- "Identifying when and where data is being passively collected about your actions and interactions.
- Understanding the algorithmic manipulations performed on large sets of data to identify patterns.
- Weighing the real and potential ethical impacts of data-driven decisions for individuals and for society." (2015, 3.)

As big data analytics will influence nearly all decisions within organizations and employees will face big data on a daily basis, growth and improvement in big data literacy among organizations and employees will improve the effectiveness of big data (Scholz, 2017, 149).

There are numerous examples of how big data analytics can be utilized in HRM. Big data most likely will support in the search for candidates and provide insights into the recruiting process. In recruiting, big data is exploited for example in candidate search efforts, recruiting hidden talent, candidate communication and employer branding. (Scholz, 2017, 75–76.) Background checks on employees through big data has become more and more accepted today and social media profiling has become a part of employment screening, even though it is unclear whether these results are suitable for classifying potential candidates (Scholz, 2017, 146; Sorgdrager, 2004).

Big data is being used by organizations since they claim that the subjective nature of people is hindering their business such as recruitment whereas, big data is contemplated to be less biased (Scholz, 2017, 162). Although big data is conceptualized as objective by eliminating people's subjective instincts, the subjectivity of big data must also be taken into consideration for various reasons. As anticipated even big data contains errors, blind spots

and subjectivity through algorithms constructed by people. (Scholz, 2017, 162.) Only a fraction of information available is useful and relevant to the data exploiting party, which makes it difficult to identify and implement the right algorithms for data collection. Appropriate algorithms can be used to evaluate data according to its importance, relevance and purpose. (Bâra et al., 2015, 3–4.)

Targeted advertising regarding job posts is also possible when using big data and algorithms. By using data and complex targeting algorithms, it is possible to target personalized job advertisements to enhance advertising effectiveness (Aguirre et al., 2015). In this way, it is possible to gain visibility and advertise job publications to the targeted audience (Liu & Mattila, 2017, 34).

Big data provides opportunities for talent assessment. With big data the evaluation methods have been improved and now it is possible to build competency models. With huge masses of employee data and modern technologies, organizations can calculate the performance of employees. These competency models can be exploited in recruitment by predicting job performance. Also, by utilizing big data, it is possible to predict and understand employees' career interests in a superior way by linking individual career choices and planning with data. Therefore, big data can also help in internal recruitment to explore career paths and by providing personalized career guidance and in result reduce employee turnover. Also, trends can be predicted with the help of big data. (Sivaram & Ramar, 2010, 23; Zang & Ye, 2015, 43–44; Varian, 2014, 5.)

It is important to recognize that big data is still in the development stage with its techniques, concepts and methods being far from mature. Despite all its advantages, big data can't solve all problems – unstructured data can't completely replace traditional structured data, concluding to structured data still being dominant. When considering the human resources management field, big data technology should not be used when problems can be solved with traditional structured data. Also, personal privacy issues are in danger of being violated while using big data. (Zang & Ye, 2015, 44–45.) A crucial challenge that big data also brings into consideration is the fact that it doesn't always provide the right information (Zang & Ye, 2015, 45).

Even though, big data analytics can provide substantial assistance in the recruitment process, it is still not seen from a strategic perspective in HRM (Scholz, 2017, 75). Utilizing big data analytics in HRM will always have an ethical dimension. Organizations must consider whether it is ethical to use information derived from big data as new ways of generating big data are emerging. (Scholz, 2017, 118.) The use of big data in the recruitment process constitutes a risk for discrimination, since recruitment on a basis of data or numbers can potentially disguise discrimination behind a veil of objectivity (Scholz, 2017, 147). Therefore, big data should not be blindly exploited, without observing its operations (Scholz, 2017, 147).

2.5.3 Artificial Intelligence in recruitment

Intelligence itself is difficult to define and for thousands of years people have tried to comprehend how we think. The field of artificial intelligence (AI) pursues to understand and build intelligent entities. In short, AI can be defined as a computer or computer program that is capable of performing intelligent functions. A more precise definition of AI is challenging, because it is relevant to any intellectual task and encompasses an enormous variety of subfields. (Stuart & Norvig, 2016, 1.)

There are several definitions of AI. In Table 1, Stuart and Norvig (2016, 2) have presented four approaches to AI and eight definitions of AI presented by different people with different methods. Thinking-related approaches are found at the top, whereas the behavior-related approaches are one the bottom. The definitions on the left, the human-centered approaches, measure success in terms of human performance and the definitions on the right, the rationalist approaches, measure rationality, an ideal performance measure. The human-centered approach involves observations and hypotheses about human behavior, whereas the rationalist approach involves a combination of mathematics and engineering. (Stuart & Norvig, 2016, 2–3.)

When utilizing AI, it is important to note that people approach it with different goals in their minds. Based on the different approaches to AI, Stuart and Norvig (2016, 29) recommend considering whether you are concerned with thinking or behavior and do you want to model

Table 1. Definitions of AI, organized into four categories (Stuart & Norvig, 2016, 3)

Thinking Humanly	**Thinking Rationally**
"The exciting new effort to make computers think … *machines with minds*, in the full and literal sense." (Haugeland, 1985) "[The automation of] activities that we associate with human thinking, activities such as decision-making, problem solving, learning …" (Bellman, 1978)	"The study of mental faculties through the use of computational models." (Charmiak & McDermott, 1985). "The study of the computations that make it impossible to perceive, reason, and act." (Winstron, 1992)
Acting Humanly	**Acting Rationally**
"The art of creating machines that perform functions that require intelligence when performed by people." (Kurzweil, 1990) "The study of how to make computers do things at which, at the moment, people are better." (Rich & Knight, 1991)	"Computational Intelligence is the study of the design of intelligent agents." (Poole et al., 1998) "AI… is concerned with intelligent behavior in artifacts." (Nilsson, 1998)

humans or work from an ideal standard. Human behavior can be described as rational to a certain extent, but perfect rational decision-making is not possible for human beings, since the limits to human consciousness make it impossible for us to gather all the necessary information to find the optimal solution for each problem (Simon, 1968; Omohundro, 2008, 488).

Even though it is a fairly common opinion among scientists that analysis outperforms intuition in recruitment, intuition-based recruitment, as an irrational process, remains an elephant in the room of recruitment (Highhouse, 2008, 336; Miles & Sadler-Smith, 2014, 606; Cert & Wilcockson, 1996, 667). Intuition is always involved in recruitment, even if it is not noticed and it often even plays a major role in decision-making (Vaahtio, 2007, 110). AI aims to avoid becoming irrational which is why it tries to eliminate any remaining irrationalities (Omohundro, 2008, 487–488). In this research the rationalist approach is adopted where AI acts in the best possible way in a situation. This approach has been chosen

because during a recruitment process it is necessary treat all candidates as fairly and equally as possible.

As in most things, AI also has its share of benefits and risks (Nadimpalli, 2017). It is predicted that AI will improve human abilities in numerous ways in the future. Today, remembering, understanding, recognizing patterns, making choices, adapting to change and learning from understanding are abilities AI has. With the support of AI, technologies have become smarter and have created a way to gain significant benefits. Most likely AI will maintain its position or will play a progressively more important role in the field of technologies. The risk may be realized when AI begins to build machines which are more intelligent than human beings. (Hussain, 2018, 838–841.)

AI techniques can be applied in employee recruiting for example by using information extraction techniques that automate the process of résumé identification and extraction of relevant information (Kaczmarek, Kowalkiewicz & Piskorski, 2005, 4). Information extraction refers to a process where knowledge and information is acquired by skimming a text (Stuart & Norvig, 2018, 873). AI is also capable of recognizing personality and acquiring personality models for the Big Five personality traits by observing text and conversation through language cues. Personality traits affect many aspects of task-related individual behavior such as the general job performance (Furnham, Jackson, & Miller, 1999), sales ability (Furnham et al., 1999) and academic ability and motivation (Furnham & Mitchell, 1991; Komarraju & Karau, 2005). AI may therefore be able to interpret an applicant's personality and compatibility to the job from an application letter. It is naturally possible to ask about one's personality traits directly but Mairesse et al. (2007, 491) predict that observed personality from text and conversation will outperform models of self-assessed personality. Personality miming can also derive the mood and emotions by applying linguistic analysis to text (Faliagka, Ramantas, Tsakalidis & Tzimas, 2012, 217).

As the amount of submitted CVs and job applications can be overwhelming, automated candidate ranking systems, have been proposed to speed-up the recruitment process. Applicant ranking models can be built with the help of AI. Candidate ranking is based on AI algorithms that have learned the scoring function based on training data provided by

human recruiters. (Faliagka et al., 2012, 216–220.) New recruitment tools, such as job matchmaking tools have been created to sort CVs on job offer requirements, in order to facilitate the work of recruiters. Computer-supported job matchmaking can be implemented in various ways, for example by utilizing learning-based techniques and genetic algorithms. (Montuschi et al., 2014, 41).

In recruitment, communication represents one of the core activities and it is important to understand how communication contributes to the successfulness of recruitment (Allen, Scotter & Otondo, 20014, 143). The two main reasons why AI is wanted to succeed in processing natural languages are: first, communicating with humans, and second, acquiring information from written language (Stuart & Norvig, 2016, 860). Communication can be described as an intentional exchange of information and as people are the most communicative species, AI must learn to speak the language and join in the conversation (Stuart & Norvig, 2016, 888). Understanding natural language demands for an empirical investigation of actual human behavior, which is complex (Stuart & Norvig, 2016, 918). Communication is natural to human beings, but when it comes to algorithms they do not have to natural ability of communication. Algorithms can be created by mimicking humans and their communication. Concepts like human values can also be introduced to AI. (Heiss, 2017, 10.)

In their research Banko and Brill (2001) found that results improve as the amount of data increases. A mediocre algorithm with a larger amount of data outperforms the best algorithm with a small amount of data. Therefore, a significant amount of data is required to get reliable results. Shortage of data may thus cause problems even if the algorithms are correct. As a result, special attention must be paid on the data used. (Stuart & Norvig, 2016, 28.)

Nowadays it is no longer sufficient to develop and train only people, since it also includes the development and training of algorithms. Developing and training algorithms is vital because algorithms can learn erroneous things, just like people, but as people are able to judge them, algorithms are not. Today, algorithms are also capable of developing ideologies and creating reality (Mager, 2012). Therefore, people and machines will be working

together and learning from each other in the future and as a result HR development and AI will most likely merge into one function. (Scholz, 2017, 150.)

2.5.4 Challenges that occur when using new technology-based recruitment methods

Amongst the field of researchers, the effectiveness and opportunities that HR analytics provide are controversial, some advocating the issue and some arguing against it. Even though new technology and big data analytics promise to make HR management more efficient, accurate and objective, Stone (2015, 1) points out that research on the effectiveness of digital HRM is not yet sufficiently comprehensive (Zang & Ye, 2015, 41). The rapid technological development provides a new intelligent and digital context for implementing HRM practices that provide higher-quality data on human resource management, but Bondarouk and Brewster (2016, 2652) highlight that it also creates a tension between HR professionals and members of organizations. Some argue that HR analytics has the risk of being just a fading trend if it doesn't transform into an ongoing part of management decision-making (Rasmussen & Ulrich, 2015, 236–238). Bâra et al. (2015, 3–4) claim that the co-existence of complex and diverse technologies, rapid changes in the labor market and new data solutions lead to the creation of a knowledge-based management of human resources.

Generally speaking, the newly advanced e-HRM provides excellent information, but it also passes extra responsibility to HR professionals in analyzing data and e-HRM users for distribution of their own information that ultimately lays on their own choices (Bondarouk & Brewster, 2016, 2660). Data protection issues arise quickly as some information gathered about the candidates may contain sensitive personal information, including their sexual orientation and health issues, according to which an employer cannot discriminate an applicant against others. Background studies on an applicant must be based on information that is relevant to determining if the applicant is fit for a particular task. (McLean et al., 2015, 1–2.) Mostly, employees are concerned about invasion of their privacy. Invasion of privacy occurs when an individual has no control over the disclosure of information causing concern about procedural fairness (Tolchinsky et al, 1981). Personal privacy issues are in danger of being violated while using big data since people are constantly leaving personal information on the internet. While analyzing employees by obtaining this information,

companies need to consider the possible infringement of employee's privacy. (Zang & Ye, 2015, 44–45.)

While using big data analytics, organizations may blindly and unknowingly be accused of discrimination during the recruitment process. When organizations define the keywords and concepts at the data collection stage, they must avoid using terms that can be considered directly or indirectly discriminatory. If the data in the recruitment process turns out to be very homogeneous, it is possible that the big data process has been discriminatory. Therefore, organizations can not blindly rely on data collected by big data analytics and view the data with a critical eye. (McLean et al., 2015, 2–3.) Automated decision-making raises concern and is particularly problematic under the EU data protection legislation. According to the EU data protection legislation, organizations must ensure decision-making by involving people in the automated decision-making process when using big data in the recruitment process. (McLean et al., 2015, 2–3.)

When it comes to utilizing AI, in general and in recruitment, the ethics and risks of developing AI must be considered. As noted before, new technologies have had devastating negative side effects and that is why the effects of AI must be carefully considered. Utilizing AI does pose some new problems according to Stuart and Norvig:

- "People might lose their jobs to automation.
- People might have too much (or too little) leisure time.
- People might lose their sense of being unique.
- AI systems might be used toward undesirable ends.
- The use of AI systems might result in a loss of accountability.
- The success of AI might mean the end of the human race." (2016, 1034.)

In recruitment, most likely the biggest worries and problems are concerned with losing our jobs to automation, since thousands of people have already been displaced by AI programs, which may lead to a future where unemployment is high. Also, granting decision-making to AI might lead to undesirable results in recruitment. Especially, the learning function of AI may result in AI evolving to a system with unintended behavior. (Stuart & Norvig, 2016, 1034–1037.) There is a risk of AI and machines taking over, as the development of AI

accelerates (Müller, 2016, 2). It is also important to note that while big data and AI are developing as fast as they work, understanding them remains profoundly limited (LaFrance 2015, Adams in Byrnes 2016).

2.5.6 Discrimination and equal opportunities

Discrimination and equal opportunities related to recruitment have been one of the central points of interest in the recruitment research. An applicant may be a subject to multiple forms of discrimination during the recruitment process based on, for example, age, race or sexual orientation. Discrimination in the recruitment process has been mainly studied from the applicant's point of view through various surveys and studies. (Aalto, Larja & Liebkind, 2010.) Since an employer has the need to collect information about the potential candidates, it is necessary to protect the privacy and other legal rights of the applicants even before the employment begins (Ministry of Labour, Finland, 2008). In Finland, the recruitment process is governed by legal provisions such as the Non-Discrimination Act, the Employment Contracts Act, the Act on the Protection of Privacy in Working Life and the Personal Data Act. Employee-related legal provisions also arise from international agreements, international human right conventions and the International Labor Organization (ILO) and the prescribed legal rights that the European Union has agreed on. These international legal provisions mainly concern the prohibition of discrimination in working life. (Koskinen, Nieminen & Valkonen 2008, 3–10; Kairinen 2009, 1–3.)

Data protection issues emerge rapidly as some of the information gathered from the candidates may contain sensitive personal information, including information about their sexual orientation and health issues, according to which the employer must not discriminate the individual against other job seekers. Background checks addressed on job seekers must be based on information that is relevant to determining whether the applicant is suitable for the particular job. Organizations must ensure that during the recruitment process they do not operate in a way that is considered discriminatory activity. Every applicant deserves equal treatment despite their religious conviction, age, sexual orientation and so on. Recruitment has become a multi-step process that requires versatile, competent and reliable knowledge of job applicant's rights. (McLean et al., 2015, 1–2; Ministry of Justice, Finland, 2014.

2.5.7 The Finnish Non-Discrimination Act

The aim of the Non-Discrimination Act is to prevent discrimination and promote equality, in addition to protecting those who have been discriminated against. "*Direct or indirect discrimination regarding age, ethnic or national origin, nationality, language, religion or belief, opinion, state of health or disability, sexual orientation or other personal characteristics is prohibited*" according to the Finnish Non-Discrimination Act. There is an important distinction between direct and indirect discrimination. Direct discrimination refers to a situation where an individual is treated less favorably based on personal characteristics. Indirect discrimination occurs when an organization's rule, criterion or practice have the effect of disadvantaging individuals compared to others based on personal characteristics. (Ministry of Justice, Finland, 2014.)

Employers are obligated to promote equality amongst the workplace and must take necessary measures to promote equality and plan these measures. Also, discriminatory work advertisements are prohibited, where an employer unlawfully requires certain personal characteristics or qualities referred to in this Act. (Ministry of Justice, Finland, 2014.)

2.6 Overview of the theoretical framework

In Table 2, the effects of new technologies presented in the theoretical framework and their impact on the different phases of the recruitment process are displayed in a summarizing table. The table consists of the phases of a recruitment process that were previously presented in paragraph 2.3, in addition with the new technological solutions that were studied. The recruitment process starts with establishing recruitment objectives (filling a certain position, what type of applicant is sought etc.), and progresses with strategy development (strategy for filling the position, where/whom to recruit etc.). After addressing the strategy-oriented questions, recruitment activities (recruitment methods etc.) are carried out. (Breaugh, 2008, 104–105.) Efforts have been made to take into account the characteristics of each phase during the recruitment process and compare them with the opportunities offered by these new technologies.

Table 2. Overview of how new technology-based tools can be utilized in the recruitment process.

Technologies	**Recruitment Objectives**	**Strategy Development**	**Recruitment Activities**	**Benefits of technology**
Online recruitment	- Enhancing the visibility of the organization (Searle, 2006). - Online recruitment job boards (Galanaki, 2002). - Predicting job satisfaction and organizational-fit (Searle, 2006).	- Easy access to potential applicants (Searle, 2006). - Identifying passive job seekers (Searle, 2006).	- Screening applicants (Viitala, 2007). - CV- and application banks (Panayotopoulou et al., 2005).	- Online recruitment has reduced routine work (Dhamija, 2012). - Online recruitment reduces cost & time and improves candidate pool & quality of candidates (Panayotopoulou et al., 2005).
Big Data analytics	- Employer branding (Scholz, 2017). - Targeted advertising to gain visibility (Liu & Mattila, 2017). - Predicting job performance of new hires (Zang & Ye, 2015).	- Reaching candidates with targeted job advertising (Aguirre et al., 2015). - Supports in the search for candidates (Scholz, 2017).	- Managing huge masses of applications (Bâra et al., 2015). - Screening applicants - Identifying the most suitable applicant - Candidate communication (Scholz, 2017).	- Creating a competitive advantage in recruitment (Bâra et al., 2015). - Automation of routine tasks in recruitment (Nilsson, 2005, 73). - Eliminating subjectivity (Scholz, 2017).
Artificial intelligence	- Advertisements to reach the ever-growing audience (Montuschi et al., 2014).	- Job matchmaking (Montuschi et al., 2014).	- Automating the process of candidate screening (Kaczmarek et al., 2005). - Candidate ranking (Faliagka et al., 2012). - Candidate communication (Stuart & Norvig, 2016).	- Speeding up the recruitment process (Faliagka et al., 2012). - Co-operation with AI (Scholz, 2017).

3 CONDUCTING THE RESEARCH

3.1 Research philosophy

Research is always based on a number of hidden assumptions even if it is very pragmatic. These assumptions concern people, the world and, for example, information acquisition. Assumptions are called underlying research or philosophical basic assumptions. (Hirsijärvi, Remes & Sajavaara 2009, 129.) The focus of this research is on Finnish recruitment professionals and understanding their views and experiences on new technology-based recruitment methods. Traditionally, the scientific field of research has been divided into objectivity also called positivism and subjectivity, also known as interpretivism (Koskinen, Alasuutari & Peltonen, 2005, 34). As the purpose of this research is to describe experiences and perspectives of recruitment professionals, these views are subjective. For this reason, the key research philosophy that is applied in this research is the philosophy of interpretivism. As this study focuses on interacting with people to comprehend their perspectives, the philosophy of interpretivism is relevant. A positivist approach was considered to be unsuitable for this type of research since the study does not focus on predicting outcomes or discovering patterns and regularities which would usually require large samples of quantitative data and statistical hypothesis testing (Denscombe, 1998).

Interpretivism studies are usually focused on meaning and can use a variety of methods to reflect different aspects of the phenomenon. Interviews, such as unstructured interviews are a natural approach to data collection in the interpretivist approach. Carson et al. (2001, 6) describe the differences between positivism and interpretivism as showed in Table 3. First, the nature of reality in positivism is objective and in interpretivism subjective. Second, the goal of research in positivism is clarification and distinct prediction, whereas, in interpretivism comprehension and weak prediction. Third, the focus of interest in positivism is what is common, typical and representative, while in interpretivism is what is particular, exclusive and different. Fourth, the desired information in positivism is how most people think, whilst, in interpretivism is how some people think about the phenomenon. In addition, the techniques used in positivism include formalized statistical and mathematical methods, while in interpretivism primarily non-quantitative techniques are utilized. (Carson et al., 2001, 6; Neuman, 2013; Hudson & Ozanne, 1988.)

Table 3. Broad definitions of positivism and interpretivism (Carson et al., 2001, 6).

	Positivism	**Interpretivism**
Ontology *Nature of reality*	Objective	Subjective
Epistemology *Goal of research*	Research focuses on generalization and abstraction Possible to obtain hard, secure objective knowledge	Research focuses on the specific and concrete Seeking to understand specific context
Methdology *Focus of research* *Techniques used by researcher*	Concentrates on description and explanation Formalized statistical and mathematical methods predominant	Concentrates on understanding and interpretation Primarily non-quantitative

The interpretative and positivist approaches differ in the approaches to the interpretation of an individual. In the interpretative reality view, reality is socially constructive, and an individual's interpretation affects the experience of life and how the world is presented to the individual. People are therefore interpretative creatures that cannot be studied as a scientific phenomenon. (Bryman & Bell, 2011, 16). From an interpretative point of view, reality is a subjective experience of an individual (Saunders, Lewis & Thornhill, 2009, 113). This research is approached by focusing on recruiting professional individuals' experiences. Therefore, implementation of a qualitative research method is rational.

During the research process, two main logics can be distinguished which guide the research process: deductive logic and inductive logic. Deductive logic is governed by the idea that theory is the primary source of knowledge. According to this view, the researcher is able to form hypothesis about the researched phenomenon on the basis of known theoretical knowledge. When the research process is driven by the deductive logic the research process is linear and proceeds on the basis of theory to empirical research. Research based on inductive logic, on the contrary, advances, on the basis of empirical material, the researcher moving from the empirical material to the theoretical concepts. (Eriksson & Kovalainen, 2008, 22.)

These two types of research logic rarely appear in their purest format. Instead, many researchers use both inductive and deductive logic at different stages of the research. Such a logic that combines inductive and deductive logic can be called abductive. (Eriksson & Kovalainen, 2008, 23.) The logic of this study can be described as abductive as it has moved from theory to empirical research and again from empirical research back to the theoretical part.

3.2 Research strategy

Research methods in scientific research are divided into quantitative and qualitative methods (Hirsijärvi, Remes & Sajavaara, 2009). This thesis applies a qualitative research method, which intends to create understanding on the phenomenon under research. Collecting the data began by looking for interesting interviewees among Finnish recruitment professionals. To build further understanding, eight Finnish recruitment professionals were interviewed from various backgrounds. This chapter describes the research methodologies used, and how the data was generated and analyzed.

3.2.1 Qualitative research method

The qualitative research method enables to study the phenomenon as comprehensively as possible. As a phenomenon, new technology-based recruitment methods, are not yet well known in the academic research, which supports the intention to generate understanding about the phenomenon. A qualitative research method is appropriate for the phenomenon of new technology-based recruitment methods since qualitative research does not aim to make statistical generalizations, but describes, understands and gives a meaningful interpretation of the phenomenon under examination (Eskola & Suoranta, 1998, 61). For this reason, the thesis draws on a qualitative research approach that seeks to find in-depth answers that help to widen knowledge about the phenomenon. Also, conducting a quantitative research would be difficult, as the usage of technology-based recruitment methods is still relatively low in Finland, and the academic research lacks general understanding over the phenomenon.

Method selection is most often controlled by what kind of information is searched and what type of information is being sought (Hirsijärvi et al. 2009, 208). In a qualitative study, the phases of research i.e. data collection, analysis, interpretation and reporting are intertwined, meaning that separating one from another for the next steps can be difficult (Eskola & Suoranta, 1998, 16). Accurately planning the material collection process and processing time are hard to prepare in advance. Conducting interviews was selected as the data collection method. In qualitative research, generating material often occurs through interactive interviews. This means that the researcher is already involved in the early stages of the creation of the empirical material in the formation of analysis and interpretation (Gummesson 2005, 312). Therefore, qualitative research is generally characterized by the fact that collecting and analyzing data is often difficult to distinguish (Metsämuuronen 2008, 21).

In this study, it was important to have the opportunity to ask further questions to deepen knowledge about the phenomenon and to clarify the answers, if the answers only scratched the surface. The phenomenon in general is broad and opinions range largely according to experience and knowledge about the phenomenon. The interviews were carried out as semi-structured, in other words, as theme interviews (Hirsijärvi & Hurme, 2008, 47). Theme interviews can be described as an intermediate form between a fully open interview and an interview, conducted based on a precise questionnaire. In a semi-structured interview, responses are not tied to response options, although the questions are the same for everyone. Therefore, the interviewees can describe their answers in their own words and by using their own terms and expressions. In addition, a thematic interview allows the interviewee to give the most natural and free responsiveness to the questions asked (Hirsjärvi & Hurme, 1988, 8). Some aspects of the interview are therefore predetermined, but not all (Hirsjärvi & Hurme, 2008, 47; Koskinen, Alasuutari & Peltonen, 2005, 104).

In this type of study, semi-structured theme interviews are well justified. Semi-structured interviews, i.e., theme interviews were selected since they are applicable for this kind of phenomenon, which is notably new and still quite unfamiliar in Finnish organizations in general. In theme interviews, the pre-determined themes guide the discussion and ensure that the interviewee does not go too far from the topic, but also releases the interviewer from a subjective point of view. A semi-structured interview was best suitable for this research since a completely unstructured, open interview would most likely have caused excessive

detachment from the pre-determined themes and hence the whole subject. A thematic interview is not usually cut to stone and gives room for flexibility, but neither it isn't' a completely free form of interview (Hirsjärvi & Hurme, 2008, 45–48.)

Creating a comprehensive framework for the interview is one of the most important tasks when using thematic interviews. In the thematic interview, certain concepts and sub-concepts that will be discussed are defined in advance, on which the questions will be addressed. (Hirsjärvi & Hurme, 2004, 48, 66.)

3.2.2 Data generation

In a qualitative research, the interviewees are selected by their availability and suitability for the research (Eriksson & Kovalainen, 2008, 51). In this research, the interviewees were recruited after extensive research on the Internet, first analyzing their backgrounds in recruitment. The emphasis on the selection was their professional career and experience in the field of recruitment. Finding the right recruitment professionals for these interviews was quite difficult, since the subject is still relatively new in Finland. After collecting a group of potential interviewees, they were contacted personally and asked about their interest in participating in an interview. The interviewees were clearly some of the most informed professionals in Finland when it comes to the field of recruitment. Most of the interviewees were already well-advanced in their careers and experienced recruitment professionals. Most of the interviewees had long experience in recruiting. Eight recruitment professionals were interviewed, and all these interviews were carried out during the first months of 2018.

The recruitment professionals had diverse and diverging backgrounds, for example, in fields of business, education and work experience. Some acted as providers of recruitment tools that utilize artificial intelligence, others recruited in behalf of other organizations and some were in charge of staffing their own organizations. All interviewees were highly educated and worked as specialists, most in recruitment and staffing and some in technology. The interviewees were all in a fairly high role, usually responsible for the resources and most also acted in a supervisory position. Some interviewees used artificial intelligence solutions in their recruitment process on a daily basis. Others were only in the deployment phase and some did not make use of artificial intelligence in their recruitment process at all. In order

to have a wider perspective on the phenomenon, also an organization which had abandoned AI solutions in their recruitment process was included.

Due to the fairly high roles of the interviewees, scheduling face-to-face interviews was difficult. Because of these scheduling challenges, most of the interviews were held on the phone. All of the interviewees were unknown to the interviewer beforehand. Permission to record the interviews was asked before the interviews. The interviewees remained anonymous. These facts about the interviewees shaped the material. The material collected during the interviews guided the course of the study and the material was interpreted as unique. (Hirsjärvi et al., 2009, 160–166.) The interviewees are introduced briefly in Table 4.

Table 4. Backgrounds of the interviewees

Interviewee	**Current position**	**Background in recruitment**
Professional 1	CTO, AI	Leads the AI department, which makes technological solutions to support the daily work of recruiting. Strongly co-operates with recruiters on daily basis.
Professional 2	CEO & CO-founder	Recruitment as a field was very familiar, which led to the development of recruitment software that utilizes AI.
Professional 3	Business Manager, HR & Payroll Services	Worked in recruitment for about 5 years and has recruited hundreds of applicants for versatile job assignments.
Professional 4	Recruitment Lead	About 5 years of experience in recruitment and currently leads the recruitment department.
Professional 5	HR Specialist	Extensive, about 10 years of experience in HR and recruitment. Annually conducts about a hundred recruitments.
Professional 6	VP, Strategic Resourcing	A versatile, about 10 years of experience in the recruitment industry in various tasks, like personal assessment, resourcing, recruiting and consulting.
Professional 7	Manager, Recruitment & Onboarding	Educational background in HRM and diverse experience in recruiting.
Professional 8	Talent Acquisition Manager	Background purely in recruiting, well over 10 years of experience in recruitment.

The research data was relied on to find opinions and meanings of the phenomenon that varied across the interviewees. The research material intended to answer the research questions by providing in-depth information about new technology-based recruitment methods and the opportunities and risks that are experienced while utilizing them. On the basis of the theoretical part, pre-determined interview questions were prepared for the theme interviews.

The interview frame is not specifically detailed in a theme interview, but it contains a list of themes. These theme areas represent the more specific sub-concepts or categories created on the basis of the main concepts, which, in turn are more detailed and concentrated. During the interviews, these themes became more precise with additional questions. In order to obtain the widest possible information about the researched phenomenon, the scope of the theme should be sufficiently wide. (Hirsjärvi & Hurme, 2008, 66–67.)

The interview frame can be found at the end of this study (appendix 1). The interview was divided into three themes. The first theme discussed how new technology-based solutions such as artificial intelligence can be used in the recruitment process. The second section examines the opportunities and risks that are perceived when utilizing new technology-based recruitment methods. The last theme concerns the future prospects of the recruitment process.

The theme interview is characterized by the fact that the themes do not always proceed completely in the order of the interviewer's body, depending on the respondents' responses. However, the interviews mostly followed the order of the frame. For some respondents, the need for more specific questions was greater than others, especially when the questions were broad. Generally speaking the interviewees answered the questions on their own initiative. In these situations, it was necessary mainly to present only more extensive or specific questions regarding the theme. Table 5, presents information about the conducted theme interviews. The interviews were conducted during January, February and March 2018, out of which three were face-to-face meetings and five regular phone calls.

Table 5. Theme interviews

Interviewee	**Date**	**Place**	**Lenght**
Professional 1	17.1.2018	Helsinki	65 minutes
Professional 2	25.1.2018	phone interview	50 minutes
Professional 3	26.1.2018	Tampere	62 minutes
Professional 4	31.1.2018	phone interview	34 minutes
Professional 5	13.2.2018	phone interview	62 minutes
Professional 6	14.2.2018	Tampere	60 minutes
Professional 7	16.2.2018	phone interview	63 minutes
Professional 8	8.3.2018	phone interview	42 minutes

All in all, eight professionals were interviewed, and the length of the interviews ranged from 34 minutes to 65 minutes. The interviews were recorded with the consent of the interviewees so that writing the answers would not have taken the interviewer's attention from the discussion. Nonetheless, notes including keywords and key findings were simultaneously written.

The first interview was a pilot interview to test the suitability of the interview frame. Only some minor adjustments had to be done as the interview frame was seen as suitable to serve the purpose of this study. The interviews were transcribed shortly after the interviews. The interview recordings were first translated into English (the interviews were originally conducted in Finnish) and then transcribed. The interviews were translated into English as accurately as possible. The process of data generation for this research with the schedule is summarized in Figure 3.

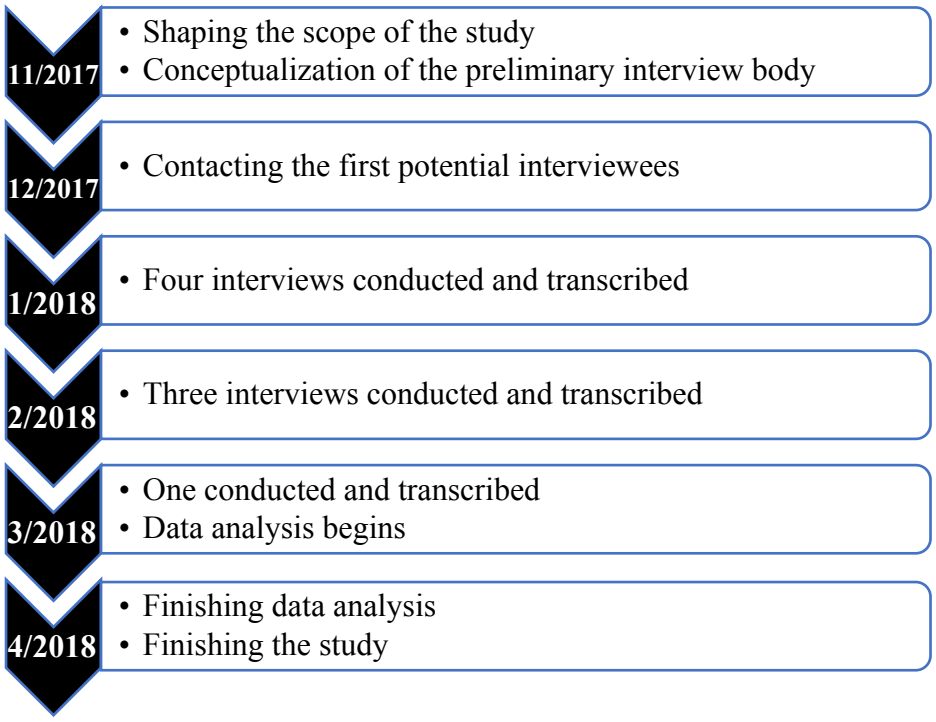

Figure 3. The process and schedule of data generation

3.2.3 Data analysis

After all the interviews were conducted and thoroughly examined, the interviews were coded by looking for themes that arise. The purpose of analysis was to clarify and summarize the data while preserving the information contained in the material. The analysis also seeks to produce new theoretical information about the phenomenon. (Eskola & Suoranta, 1998, 138.) The interviews were first listened to and written out of the word. Interviews and their contents were then studied. Then, reduced expressions were searched and underlined. Subsequently, the reduced expressions were listed, and similarities and differences were sought. Then the reduced expressions were grouped, and subcategories were formed. Subcategories were then combined, and the upper classes were formed. Finally, the upper classes were grouped into sections. (Tuomi & Sarajärvi, 2018.)

The material was analyzed with a thematic framework, which is a natural way of analyzing thematic interviews (Saaranen-Kauppinen & Puusniekka, 2006). The interview texts were coded by marking similar subjects with the same color and gathering these sections marked with the same color together. In the analysis phase, frequently emerging themes were looked for. Some of these features may arise from the themes discussed in the interview but besides

these, there might be other maybe even more interesting themes that emerge from the material. (Hirsjärvi & Hurme, 2004, 173). The research was directed by three predetermined themes. Since the research material was collected by theme interviews, these three themes facilitated the compilation of the material, and made this process a bit easier.

The themes of the material highlight the themes of the research questions. (Eskola & Suoranta, 1998, 176). The themes that arise are always dependent on the researcher's interpretation (Hirsjärvi & Hurme, 2004, 173). To convince the reader, samples of material, i.e. quotations, are presented to demonstrate the material more profoundly (Saaranen-Kauppinen & Puusniekka, 2006). However, in order to provide comprehensive research data, only the quotations are not sufficient for analysis and, therefore, there will be an interaction between the theory and empirics (Eskola & Suoranta 1998, 176). Also, the empirical results will be presented in the light of previous research.

After identifying themes, the material was grouped into types, which were summarized descriptions of the material (Eskola & Suoranta 1998, 182). The types identified are like cross-sections of the material that highlight the most important content; typically, they are characteristic similarities which arise from the material (Saaranen-Kauppinen & Puusniekka, 2006). Based on the identified types, we can find out what kind of themes arise from the material and these types can also be easily compared to the material (Eskola & Suoranta 1998, 182). This method of analyzing data will most likely bring the broadest picture of the phenomenon. An example of the data analysis process is presented in Table 6.

During qualitative research and interviews it is common that interesting areas of the topic arise, which are new to the interviewer and have not necessarily been taken into account in advance (Tuomi & Sarajärvi, 2009, 92). This phenomenon occurred in this research also and some issues that raised in the material had to be excluded from the research to keep the focus on the research problem.

Table 6. Example of the data analysis process (Tuomi & Sarajärvi, 2018).

Original expressions	**Reduced expressions**	**Subcategories**	**Main category**
"Wherever you use machine learning algorithms you do not get people to trust them and you cannot trust it yourself until you know what it is. We collect a lot of data and we need to show people a reasonably filtered and easily understandable explanation. This should play the key role. Waking up trust is A and O."	- Distrust in AI and algorithms - Sharing information in an understandable form - Information increases trust in AI	Trust and uncertainty about utilizing AI in recruitment	The use of AI in recruiting
"I hope that when utilizing new technologies, we think about why we are using it, what is its purpose, what we are measuring and what is the value created in the overall process."	- Clearing the reason why new technologies are utilized - Worry about the attitude of service providers	The service providers approach on using AI in recruitment	External service providers
"It has made communication much easier. It is a concrete acceleration. Prior, I had an awful amount of contacts coming by phone and email. Now the system via AI proactively sends messages to applicants, for example when their applications are being looked at."	- Example of how AI is utilized in candidate communication - Benefit of AI in daily recruiting - Up-to-date communication with candidates	The use of AI in communicating with candidates	Phases where AI can be utilized in the recruitment process

3.3 Validity and reliability of the research

One of the challenges in qualitative research is to convince the readers of the validity and reliability of the scientific research. Validity refers to the extent to which the arguments,

interpretations and results expressed in the research indicate the subject they are supposed to refer to, in other words, the credibility of the research (Koskinen et al., 2005, 254.) Reliability, in turn, refers to the repeatability of findings, reliability of the data and the fact that the collected data can be used to describe the studied topic (Koskinen et al., 2005, 255). Validity and reliability are concepts that are often used to evaluate the consistency and the creditability of the research method. However, these concepts have emerged in quantitative research and are thus better suited to face the needs of quantitative research (Tuomi & Sarajärvi, 2009, 136).

The researcher's own values, understanding and assumptions can influence the reliability of the study and the analysis of the data (Hirsijärvi et al., 2009, 161). Assumptions have been made by the researcher while analyzing the material; these assumptions can vary with the interviewee, whose perception of the world is different in terms of values, understanding and beliefs. For this reason, the qualitative research always contains subjective perspective of the researcher and therefore no complete objectivity can be achieved (Hirsijärvi et al., 2009, 161). Also, the theoretical framework is influenced by subjective choices made by the researcher. The research material also influenced the formation of the theoretical framework.

Ensuring the reliability of the research is challenging in qualitative research, because the researcher's own interpretations influence the research results (Saaranen-Kauppinen & Puusniekka, 2006). In this study, the validity and reliability have been sought to be ensured through several different means.

One essential factor is ensuring the repeatability of the research. Repeatability is, however, challenging in qualitative research, as the phenomenon being investigated may change over time. In qualitative study, the validity and reliability can be assured by describing the course of the study, the collection of the data as well as the analytical methods used in the interpretation as accurately and transparently as possible. The research report should therefore have a systematic explanation of how the research process was conducted (Koskinen et al., 2005, 258–259). The research process is aimed to be described as accurately as possible so that the study could be conducted again achieving the same results.

The reliability of the research is also influenced by the fact that whether a sufficient amount of empirical data is collected. In qualitative research, the adequacy of the material can be assured through saturation. Saturation refers to the situation that occurs when material begins to repeat itself and no new information is found of the phenomenon (Saaranen-Kauppinen & Puusniekka, 2006). In this study, saturation of the material has been achieved through conducting several interviews. Sufficient number of interviews were conducted as the same points started to appear again and again in the interview reports.

3.4 Limitations

Every research has its limitations and it is important to aim to minimize the range of limitations throughout the research process (Dudovskiy, 2016). As the phenomenon is relatively new, the lack of previous studies in the research area appears to be one clear research limitation. The existing literature review is usually being used as a foundation for new research, but in this case the existing literature does not yet offer a broad view on the phenomenon.

In qualitative research, generalizing phenomenon's usually cause problems, but on the other hand, the goal of qualitative research is not usually even creating generalized knowledge (Koskinen et al., 2005, 167). Even though, the interviewees came from different backgrounds and work in different fields, the results of this research cannot be generalized. It is natural that the service providers do not necessarily want to talk about the negative aspects of the phenomenon and their products. The selection of the interviewees has also been carried out in a subjective manner and thus does not necessarily represent generalizable opinions.

4 RESULTS

4.1 The impact of new technologies in the field of HRM

New technologies traditionally cause uncertainty among people (Hall & Khan, 2003, 3). Whenever new technologies arrive, most tend to worry about how this will affect their work and lives in general. This research is based on how technologies have influenced a recruiter's daily work. Each interviewed professional recruiter had noticed considerable changes in the recruitment tools available over the years. Whether it's a well-functioning recruitment system that enables the entire recruitment process to be carried out or a single tool such as the use of recorded video interviews, these technologies have arrived to facilitate the recruiter's everyday life. The perception, that technology has generally come to ease the everyday work prevailed among all the interviewees. Managing the entire recruitment process has become less painless when everything is in one system and there is less fear that something or someone will be forgotten during the process.

During the interviews HR was often described as a highly urgent business unit, because workloads are often large and demanding issues occur on a continual basis. In addition, the field of HR was described as difficult to change, and that HR is usually the last unit in front of change. There seemed to be unwillingness to change and also slowness was emphasized, especially in large organizations.

> "*In general, recruiting and the HR sector as a whole in Finland is like a big ship that turns really slowly. Very traditional ways to do things, everyone is copying the same old. There is no degree of renewal, though there is much talk about it." (Professional 7)*

> *"HR is one of the last strongholds where all manual work will be cleaned out." (Professional 6)*

The interviews also revealed that it can be challenging to introduce new technologies in large organizations, because the pace of change and decision-making is slower in large organizations with a lot of hierarchy.

4.2 The use of AI in recruiting

AI is one of the newest and most fascinating new technologies that has come to affect the recruitment process. Recruitment is considered to be one of the most important tasks of HR and it appears to be a time-consuming process to a high degree. AI is currently constantly on display, as well as in the media and among people and organizations. The use of AI in recruiting has caused a lot of discussion among professional recruiters. Utilizing AI has generally raised a lot of debate in both media and among public. AI is envisioned to be the next and fourth industrial revolution.

> "*Probably we are going more in the direction where it [artificial intelligence] is the next industrial revolution. First, we had the wheel, then the steam engine, then the computer and now comes artificial intelligence." (Professional 6)*

Also, in Finland people have become increasingly interested in AI and have started to understand its existence and its impact on our lives. Implementation of new technologies is always challenging. When it comes to AI, in Finland, we have pioneers but also reluctant organizations who do not want to deviate from their traditional activities in addition to the one's in between. It could be said that the most technology-oriented and innovative organizations are most eager to take full advantage of AI in recruitment processes. Finns are rather cautious by nature, and it can be said that it also applies in taking development steps with new technologies.

> *"People are interested in artificial intelligence, it's the kind of thing that I think is pretty well accepted." (Professional 2)*

> *"In Finland we are very concerned about taking development steps with artificial intelligence. We talk about it a lot and what we should do with it and what kind of programs are available, but we do not dare to look at what artificial intelligence would bring to our recruitment processes." (Professional 3)*

During the interviews AI often aroused some sort of emotional reaction, which was often quite strong whether it was negative or positive. Such a large variation in these opinions regarding AI was not expected during the interviews. However, these major differences in

opinions broadened the perspective of this research. Therefore, the results were not so unambiguous, and the phenomenon was interpreted and viewed from various perspectives. This allowed the two extremes of the same phenomenon to emerge. On the other hand, universally AI was thought to affect the future of work and people, but to what extent, remains a question. There are numerous predictions and different scenarios about AI. Most of these predictions are confident that AI and algorithms will change the way we work. The interviewed recruitment professionals were united in the fact that AI will affect our future job profile and may eliminate routine tasks from their work. So, the interviewees considered it as a fact that work will most likely change, but whether this was taken as a good thing or a bad thing varied amongst the interviewees.

> *"It is likely that most of the scenarios and forecasts about artificial intelligence will be false predictions." (Professional 5)*

The use of AI does split opinions fairly strongly among recruiting professionals. Recruiting professionals and people who use AI in their daily work do not mostly see AI as threatening, but in general artificial intelligence causes concern. As a definition AI is so complex, that most of the interviewees found it difficult to determine what can even be called as AI during a recruitment process. Each recruitment system usually involves AI at least at some level, for example most of these systems identify when the applicant has previously applied for a job in the organization and is able to retrieve their data automatically. Is this considered as AI or is this already listed as a normal criterion of a recruitment system? Some of the interviewees found this classification difficult. In fact, AI has somewhat become so commonplace that its existence may be difficult to detect.

> *"The definition of artificial intelligence varies depending on who you ask. What is comparable to human intelligence?" (Professional 5)*

> "*Nobody compares Excel to artificial intelligence. So that's the core of my criticism. Sometimes I wonder if people even know what artificial intelligence actually is." (Professional 6)*

The interviews revealed the opinion that people have forgotten the fact that AI is software just like any other, it is only written differently. AI is often seen as a great and scary thing

that is coming even though AI is in some form already a part of our daily life. Email spam filters use AI to detect spam and recommendation algorithms suggests us music and TV shows we will probably like. And above all, people are needed in this development as well.

> *"The idea is that artificial intelligence sounds great, but it is software just like any other, although it is written differently. Just like in every other software, there is a need for a person who has an understanding of the end user and needs that must be on the same road map." (Professional 1)*

4.3 External service providers

Based on the research material, Finnish organizations utilize AI in their recruitment process at least to some extent. Finnish companies use AI mainly through an external service provider from which they have purchased their recruitment system. As examples, two Finnish service providers, Jelpp and TalentAdore, are introduced in this thesis. Jelpp and TalentAdore sell artificial intelligence-based recruitment systems to external stakeholders.

4.3.1 Jelpp

Jelpp was developed with the help of Barona's recruiting staff to meet the challenges and needs that where met with the constantly growing number of applicants. The mission of Jelpp is a strong will to bring recruitment to the next level by taking advantage of new technological methods. By automating and controlling the recruitment process, Jelpp saves time spent in different stages of recruitment so that the recruiter can focus more on selecting the right employee. As an essential feature the applicant tracking system includes a self-learning AI algorithm, that adapts to each search by helping with candidate pre-selection, ranking candidates organized by AI and enabling AI search of CV banks and all candidates. The self-learning AI algorithm guides the selection process and gives suggestions as to which applicant is best suited to the position based on statistical probability. The self-learning algorithm is based on actual successful recruitments and it develops after every new recruit. Barona's actual recruitment history is the data on which the artificial intelligence is based on. (BaronaGroup, 2017.)

"Jelpp is a functional but traditional tracking software. AI is displayed when there are new job-seekers to the opening and then artificial intelligence organizes the applicants ranked according to how it is learned." (Professional 1)

4.3.2 TalentAdore

TalentAdore promises to bring human touch back to recruitment by providing next generation communication and candidate experience. TalentAdore was founded because recruiters are facing problems of writing each candidate a personal email. TalentAdore promises 100% personalized feedback messages and this feedback helps to build good relationships between the candidate and the recruiter, while the organization experiences improvement in their employer brand. An essential feature of this product is the AI solutions that automates unnecessary and non-value-adding manual tasks, such as scheduling interviews. That leaves more time for human-oriented recruitment work. A superior candidate experience is created by sending status updates and personalized feedback to each candidate. (TalentAdore, 2018.)

"Before all recruitment systems were aimed at employers. Systems that are as easy, quick and effective as possible for the employer. The job applicant was just an ID number in the system that is transported there as efficiently as possible. When efficiency is the main goal, one person is easily left trampled by the system. We created a system that is designed to benefit both, i.e. the job applicant and the organization. We simultaneously help the applicant to feel that they have been treated humanely. On the other hand, we ensure that the recruiter has sufficient time for the applicants." (Professional 2)

4.3.3 The service providers approach on using AI in recruitment

Most of the interviewees hoped that whenever developing or utilizing new technologies the purpose of the product has been carefully considered and to know to whom the product will benefit and in what way. Is the purpose to facilitate the recruitment process for the

organization or the applicant? What is the theory behind each technology and what are the basic assumptions of people's nature?

> *"I hope that when utilizing new technologies, we think about why we are using it, what is its purpose, what we are measuring and what is the value created in the overall process." (Professional 7)*

These service providers may not have worked even a day in recruitment in their whole lives. That is why the service providers' approach on these recruitment systems is partly frightening. Is there anyone who will question their actions and are the customers of these service providers able to demand the right things or will they just use these products without any reservations and doubts about its operation and how it works. Who will question and doubt the actions of service providers or will it end only when things explode?

> *"In many solutions, startups present the ideas as technologically advancing, but the theory behind may be taken out of nowhere. It's a great technical thing, but when you look at the whole structure, the bottom foundation about how people operate, might only be based on one book that the developers have read without even trying to figure out what the overall theory on the issue actually is." (Professional 5)*

Although it is business, i.e. marketing and selling a product, we are talking about recruitment that concerns people and therefore it is important that the products produced by service providers are well developed to avoid crucial mistakes, as this software can play a major role in the future of recruitment. It is therefore particularly essential that these products are not relied on blindly, but rather to find out how these algorithms work profoundly.

4.4 Phases where AI can be utilized in the recruitment process

During the interviews three key phases of the recruitment process where AI is utilized or at least could be utilized were identified. Pre-screening applicants, communicating with candidates and practical organizing, such as scheduling interviews can be accelerated and personalized by means of AI.

4.4.1 The use of AI in practical organizing during the recruitment process

The automation of routine job tasks was perceived to be self-evident. The fundamental idea underlying AI was the reduction of these routine tasks that take a surprisingly large amount of time from the daily work of a recruiter. Manual work tasks, such as administrative tasks, take considerable time from the more developing and complicated tasks. Recruiters co-operate with supervisors on a daily basis. The recruiter's job description also includes the supervisor's guidance on the recruitment process. The interviewed professional recruiters pointed out that their daily work involves a considerable amount of time of guiding and answering the questions of supervisors, concerning the administrative operations of the recruitment process etc. An intelligent chatbot would bring some help for these everyday questions, in which the supervisor has not simply managed to find or look for the answers.

> *"I am pretty sure that AI will eliminate basic routine job tasks, at least that's the idea." (Professional 2)*

The practical arrangements of a recruitment process are rather time-consuming. For example, booking interviews is challenging because of the coordination of schedules. The recruiter at most times needs to spend considerable amounts of time to coordinate their own, the job applicants and the recruiting manager's timetables together to find the right slot to keep the interview. New technologies could provide assistance to this and for example, the recruitment system provided by TalentAdore includes a feature where interviews can be booked via the system without the need for additional telephone calls. There is a need for assistant-like features from the recruitment system. TalentAdore calls its product a Virtual Recruitment Assistant for this reason, since it automates manual and repetitious tasks of a recruitment process. Almost all the tasks that traditional assistants do, the recruiters were willing to hand over to AI. Today, the roles of assistants have been mostly left behind, which is why this burden has fallen on the shoulders of the recruiters.

> *"For example, practical stuff like, reserving the interview time or giving arrival instructions to the interview can be handled with AI." (Professional 5)*

When it comes to routine job tasks, the recruiters did not experience difficulty of giving up on them. On the contrary, the general opinion about abandoning these routine and manual work tasks was felt as one of the best features of AI in the recruitment process.

4.4.2 The use of AI in pre-screening and pre-selection of applications

The time spent on recruitment is often limited and in addition the massive volumes and masses increase the recruiter's workload and that is why recruitment departments often need help in recruitment. Because of the lack of time and expertise, many organizations have turned to external recruitment services in order to find talent. According to the service providers AI contributes to this and reduces the recruiter's workload in recruiting. If AI is capable of screening applications, it would significantly reduce the recruiter's time on prescreening. Going through applications was listed as one of the most time-consuming processes during the recruitment process. The use of AI in reading applications raised a great deal of discussion and opinions during the interviews.

> *"When the volume is huge and scales only linearly, one person can only handle a certain number of applications within a given time. Artificial Intelligence helps accelerate and facilitate work. In practice, it is difficult to see how this could be done without artificial intelligence. It is not perfect yet, but its potential is enormous." (Professional 1)*

Some were fully convinced of the benefits of AI pre-screening applications. AI does undoubtedly speed up the process, but does it guarantee quality? This in particular divided opinions and these opinions were at times controversial. Some believed that AI increases diversity in application pre-screening, since it leaves human subjectivity out of the equation and thus no discrimination on the basis of for example age, race or sex will occur. On the other hand, when AI only repeats the choices previously made by people, if discrimination has occurred in the data, AI will only repeat the same method of working. Then discrimination will only be repeated over and over again, and diversity will not take place in the pre-screening phase. Because AI does not understand randomness and human irrationality, it can only pre-screen applications in a simplified way with, for example, keywords. People are already being urged to repeat the same keywords used in the job

announcement, so that a machine or AI would identify them as good candidates. How impersonal will cover letter become if the same keywords will be repeated in every cover letter in order to get through the screening of a machine? As a result, some questioned the ability of AI to enhance the diversity of applicants while pre-screening applications.

A human being is always the one who determines the information that AI will draw attention on in the applicant's CV and cover letter. Therefore, subjective choices have been made right from the start. If AI makes pre-selection decisions, can a recruiter identify the key items or keywords in an application letter or curriculum vitae (CV) which makes a candidate better than the other? Or is it more about the whole image created through the application letter and CV that makes one candidate stand out? AI cannot process people as entities and individuals and makes conclusions based on individual words. Most recruiters experienced that they made pre-screening decisions with some kind of intuition, and this intuition cannot be taught to technologies or machines. During the pre-selection, facts such as the educational background and work experience are considered, in addition to the personality shown in the application letter affects the decision.

> *"One part of continuous development is determining what information is relevant and how relevant. When talking about statistical correlation, more is not necessarily better." (Professional 1)*

Distrust was also caused by the fact that the service provider defines the information that AI examines. In practice, the purchaser of the service does not know on what basis the AI has chosen the best candidates, and the criteria cannot be changed and tested according to the organizations own desires. Also, the data in which the system compares applications and resumes is based on all the existing data the service provider currently has in possession. This leads to the fact that the data cannot be limited for example to a specific industry or work profession.

> *"I want it [the recruitment software] to be agile and where I can determine what I want so I can find the best possible person for each situation and need. I feel that currently in the AI scenes, you need to give up your ability to make the right solutions." (Professional 7)*

Perhaps in jobs where the job description is quite universal, such as customer service, and where large masses are frequently recruited, AI could be utilized in pre-screening candidates. Measuring culture-fit and compatibility for more demanding tasks is currently nearly impossible when utilizing AI in pre-screening.

> "*I believe that AI can be utilized in examining applications, especially in roles where recruitment is often repeated. It is easier to predict performing work. At least data is obtained for rotating the prediction model." (Professional 6)*

How can the algorithms and AI be trusted if the service providers do not elaborate how they formed the algorithms and in which way the algorithms work – this raised suspicion. Some wanted the opportunity to test the results of the machine when selecting different options. Studies are expected and hoped for where AI and professional recruiters have conducted the same recruitment process and pre-screening in order to profoundly compare the results. Today, AI, as a pre-screening recruitment tool, appears to be a bit of an uncertain pre-screening tool, that has not yet been scientifically proven to be a well-functioning concept. Most of the recruiters were not ready to hand over the decision-making to AI in pre-screening the applicants.

4.4.3 The use of AI in communicating with candidates

Communication with job applicants was also seen as one of the most time-consuming recruitment processes. When there is a desire to create the best possible candidate experience for the applicant, communication must appear to be authentic and personalized. Successful communication has the potential to stand out positively as an employer during the recruitment process in the eyes of the applicant. To most interviewees successful communication with the candidate meant that the good employer image perceives, even if the applicant did not get the job.

TalentAdore provides the opportunity to facilitate communication in the recruitment process. Majority of the interviewees were familiar with TalentAdore and its value promise of providing 100 % personalized feedback and status updates for all job candidates. However, the functionality of the product and the characteristics of AI caused disagreement

among the interviewees. Some of the interviewees viewed that the AI feature TalentAdore introduces in communication is not actually AI, but a simple generator of different phrases. When talking about fully personalized feedback, most interviewees considered that the feedback and communication, but rather options that were chosen from alternatives and that the AI feature could not give personalized feedback as TalentAdore promises.

> *"The automated candidate feedback was one of the features that interested me the most. It turned out that it cannot be completely trusted, and it requires a person to look at the phrase forms and content." (Professional 5)*

The sophistication of the product was seen to be partially deficient. On the other hand, TalentAdore was highly praised for the quality of customer service and the fact that the development proposals were implemented almost immediately. The interviewees were fairly confident that the product had evolved from its recent vision and multiple interviewees had been involved in improving the product to match their needs as a recruiter.

Keeping the job applicants up-to-date during the recruitment process was seen as a great benefit of AI contributed communication. Nowadays, job applicants like to be up-to-date with the recruitment processes and are more impatient, which is why outsourcing basic informative communication to AI is of interest.

> *"It has made communication much easier. It is a concrete acceleration. Prior, I had an awful amount of contacts coming by phone and email. Now the system via AI proactively send s messages to applicants, for example when their applications are being looked at." (Professional 3)*

However, every message generated by AI needs to be approved by a person, which means that time is spent on monitoring the system and proofreading the messages generated by the system. Some of the interviewees felt that they had to do extra work due to the messages generated by AI. Each message had to be proofread and possibly even completely rewritten. The interviewees were aware that Finnish language is not the easiest one and believed that communication would probably be more fluent in English.

> *"It [candidate feedback] is always a critical and sensitive situation. Just text is really delicate when there is no tone, sound or context involved. I believe that in English it might work better." (Professional 5)*

Feedback for the applicants was also felt to be somehow a bit problematic. Based on a single application or CV, it is very difficult to define, for example, an applicant's interaction skills or culture fit. Therefore, some of the recruiters found that they could not send feedback based on one application because giving feedback to people you have never met is a challenging situation. In addition, communication via text may end up appearing as harsh when there is no tone or other gestures involved. It is fairly risky to define a person's personality based on one application and it is likely to cause negative feelings from the applicant's point of view.

Another problem is that the applicant may not want feedback, and automatic feedback may impair the employer image in the eyes of the job applicant. Especially in Finland, an option must be given to the applicant about whether feedback was wanted or not. This option also reduces the recruiter's work, as feedback would only be sent to those who wish to receive it and therefore more focus could be given on individual feedback.

4.5 Why is AI used in the recruitment process?

The reasons for the use of AI in recruitment appeared to be quite similar. AI is considered to accelerate and enhance the recruitment process. Opinions did differ as to whether AI facilitates the workload of a recruitment process or increases it. Some found that AI has considerably reduced the workload, while others feel that with AI the workload increases because they cannot rely on it and that in turn, leads to increasing monitoring tasks.

However, it was agreed upon that if the algorithms and AI works properly, the purpose of AI is to remove manual work from recruitment so that more time remains for more demanding tasks. In recruitment, especially human interaction with both internal members of the organization and job applicants is emphasized. Recruiters want to use time on qualified candidates and that is why new technology-based recruitment methods are hoped

to facilitate some stages of the recruitment process, e.g. candidate screening and communication with the applicants.

> *"Today, the best recruitment systems make use of artificial intelligence. I no longer have to spend so much time on the recruitment process as I had to before. It makes recruiting really cost-effective." (Professional 3)*

A central theme during the interviews was that AI releases time for more demanding and sophisticated work. Hence, the recruiter can focus on essential human interaction and treat every applicant as an individual rather than part of the mass. Additional time for human interaction was considered to be a very important area and benefit that AI might provide in recruitment. Since recruiting is highly time-consuming and challenging, the possible aid offered by AI was considered necessary, assuming it will work properly.

> *"AI is going to change the ways of working and therefore professionals will have more time for human interaction. Artificial intelligence gives the opportunity to increase the amount of human interaction that requires more human work force." (Professional 3)*

The greatest benefits and opportunities new technology solutions, like AI, provide in recruitment processes is speeding up the recruitment process in addition to the reduction of time spent on recruitment. According to the service providers AI reduces considerable amounts of manual work that does not require human capital during the recruitment process. The interviewees did not agree on the fact that whether time time spent on recruiting will be reduced or increased as a result of using AI. Even though, new technologies have arrived to facilitate and help the recruiter's daily work, the time spent on recruiting has not declined. Even if AI would somehow handle all the manual work of a recruitment process, it was not believed that the time spent on recruitment would decrease, instead it was thought to increase. The time spent on recruitment will not decrease since recruitment is considered as one of the most important areas of HR, which should be focused on constantly.

> *"The idea is to reduce the unnecessary work where employees have to look through a massive CV mass, for someone with the right education, interest and ability for the job. Instead, you can concentrate more on the interview and stuff like that." (Professional 1)*

"With automation, there is more time left for developing tasks, i.e. people have more brain capacity to use for the more important tasks." (Professional 3)

However, it still remains unclear whether AI actually reduces time spent on the recruitment process as it needs to be monitored very closely. In the worst case, the recruiter has to do even more work with the use of AI. One interviewee felt that when using AI during the recruitment process, double the amount of work was required as AI first needed close supervision and also corrective measures had to be taken. This was the main reason why they decided to give up on the utilization of AI during their recruitment process.

4.5.1 Maintaining humanity during the recruitment process

Maintaining humanity during the recruitment process was seen as the most important criterion when talking about exploiting new technology-based recruitment methods such as AI in the recruitment process. In particular the service providers brought up the idea that the purpose of using AI in recruitment is not to remove humanity from recruitment, but rather to enhance the time spent on recruitment in order to allow more time for human interaction. Also, those who had a positive attitude towards AI and saw it having significant benefits agreed with this argument. A thought came to light as to whether it is suitable to utilize AI as human interaction if it can be made to appear as human interaction. Does a job applicant have to know whether they are interacting with a human being or a machine? And does this knowledge affect this interaction in some way? Can interaction be genuine when talking to a machine? It could be assumed that this would have some effect on the job applicant's communication. However, communicating with a machine has also got some good qualities. For example, it might be easier to ask questions that the applicant may not be comfortable asking the recruiter.

"Humanity should not be removed from the recruitment process. But if AI can be made to appear as human interaction, is it wrong to use it?" (Professional 5)

4.5.2 Improving the applicant's experience

AI does not only make recruitment easier for the employer but also it smoothens the process for the applicants also. Today, most organizations require that the recruitment system they use works easily and smoothly for both the organization and the job applicant. Particularly, as the economy is growing and the number of qualified applicants on the labor market is declining, organizations have to reconsider the functionality of their recruitment systems. Multi-page application forms were seen as inhumane by the interviewed recruiters and these burdensome application forms do not attract potential candidates. It was desirable to create a smooth and painless applicant experience, and this was a common understanding among all the recruiters. The importance of the applicant experience emerged in each interview. Today, improving the applicant experience is at the heart of many organizations' value propositions.

> *"It has speeded up not only our work as recruiters but also the work of applicants." (Professional 3)*

By making use of recruitment systems that seem effortless and smooth to the applicants, the applicant's experience was sought to be improved. In addition, personalized candidate communication was seen as a fundamental way to make a memorable and distinctive candidate experience for the job applicant. Maintaining a good employer image was one of the main reasons for the act of improving the applicant experience.

4.6 The benefits and risks of utilizing AI in recruitment

The use of AI in recruitment brings considerable benefits and risks with it. During the interviews, several development points and features regarding the utilization of AI in recruitment were identified. The identified benefits and risks are presented in the next chapter.

4.6.1 The undeveloped state of AI and algorithms in recruiting

Many service providers promote themselves as pioneers in AI. The current criticism towards AI utilized in recruitment systems is that it is not yet so sophisticated that it cannot even be

said to be AI. Criticism also emerged that currently it is relatively easy to enter the AI scene as a service provider, since the bar is quite low. When talking about algorithms that are made by people, there is always a chance of error. Algorithms and AI are taught by big masses of data and by human example. Naturally, it is possible for AI to learn to recruit in the wrong way, if the data or human example is biased. While teaching AI, the amount of data and number of repetitions play a crucial role in addition to the neutrality of the data. Monitoring and continuous improvement of the algorithms and its activities are part of daily monitoring functions.

> *"What if a huge PR crisis emerges, because we are utilizing a recruitment tool that makes its own decisions? That is a question, that I sometimes think about." (Professional 8)*

In a country of the size of Finland, the question arises as to whether there can ever be enough data to create a reliable self-learning algorithm? The Finnish labor market is relatively small after all. Also, data cannot be imported from abroad as culture always has an impact. If a higher amount of data nearly always guarantees the best results, is there even a slightest chance to reach the best results in a country like Finland? According to the interviewees, this is something that the needs to be paid attention to.

> *"We need a big amount of data so that this kind of self-learning model works. Not just in recruiting but in other areas as well, it is noticed that those sectors or parties that have the most data will get better results. It's a hot potato not just for us but for the whole field of research. How can artificial intelligence learn from a smaller amount of data?" (Professional 1)*

Algorithms and AI are, in the opinion of most interviewees, still not sufficiently sophisticated and there is plenty of room for development. The service providers are confident about the functionality of their products and do not doubt their algorithms, like some recruiters do. If AI is comparable to human activity, and the algorithms and data are incorrect, much destruction can be done. If no algorithm works accurately right from the beginning, on what basis can it be said that now the algorithm works correctly after improving it in a recruitment process? What is the correct operation the algorithm's activity is compared to? There was a lot of demand for studies where the work of AI and a recruiter

is compared in different stages of a recruitment process. Hereby, the machine's and human's ability to reason could be compared and note the differences in activity.

> *"There is no algorithm that would work really well right away. We measure exactly where it works and where not, and then make minor changes and improve." (Professional 1)*

Poorly implemented, the use of AI in the recruitment process appears to be a very high risk. Unaccountable algorithms should not be introduced into society and given the right for decision-making, since it poses a great threat and could even jeopardize democracy if working insufficiently. As in all new technologies, the interviewees thought that it is important to understand the workings of these algorithms and what is trying to be achieved when using them. In recruiting, a poorly written algorithm can prove to be the defining factor for the failure in recruiting, which will crucially affect the success of an organization, in the opinion of the interviewees.

> *"Poorly implemented, and the right use of artificial intelligence in the recruitment process is most definitely a threat." (Professional 2)*

> *"Artificial intelligence can be taught practically anything and therefore it can also be taught to make irrational decisions that people also make. After all, it is a machine and there is a need to create a certain harmonized process as to how it works and what kind of information it captures." (Professional 3)*

Recruitment is a difficult task to measure, because the accuracy of the selection can basically nearly ever be guaranteed. Therefore, utilizing AI in recruitment does not guarantee the most precise and accurate results. It is important to understand that there is no absolute truth, which also applies when using AI in recruitment. The interviewees, however, emphasized that in general, when making decisions, there is no absolute truth, so when utilizing AI, no exception is formed. Anyhow, this does not diminish the need for precise monitoring and control, and thorough development work.

"It must be understood that there is no absolute truth. That is why we need a precise metric and in certain situations we need to dive deeper into the analysis." (Professional 1)

Even though AI can be taught much, it is almost impossible to teach it the same type of humanity and randomness according to the experts. A recruiter often relies partly on their intuition during the recruitment process. This feature is entirely left out in the case of an AI conducted recruitment process. A recruiter can take into account the current situation of an organization and act differently after recognizing and identifying the need for a different hire as usual. Therefore, the recruiter has a sense of the situation and can choose a completely unexpected candidate to be recruited, depending on the situation. AI does not have a sense of the situation and cannot modify its way of thinking in different situations. The lack of situational awareness might formulate a problem in an AI-led recruitment process. One of AIs features is avoiding errors, so it is highly unlikely that AI can be taught randomness and humanity in recruitment.

"The kind of humanity and randomness that people do every day, I don't see that could be easily taught to artificial intelligence." (Professional 3)

As noted, AI still requires quite significant development according to the interviewees. However, it should be distinguished that recruitment is not an easy task to measure regarding the correct practices, since every recruiter works at least partly on one's own subjectivity and intuition. This was well demonstrated during the interviews.

4.6.2 Trust and uncertainty about utilizing AI in recruitment

Distrust towards new technologies often causes anxiety and that is why increasing awareness is key to eliminating uncertainty. In general, people do not have a great deal of knowledge about algorithms, AI and how they work. This was the main reason why the interviewees thought that people in most cases fear the arrival of AI. In addition, trade unions and the media have created an atmosphere in which AI will take on all of our work. Less has been said about the fact that AI will most likely offer more opportunities for a more intelligent and developed way of working. News media has a major impact on the opinions

of citizens for which news coverage should be versatile and fairly neutral, so people can form their own opinion about the phenomenon.

> *"Wherever you use machine learning algorithms you do not get people to trust them and you cannot trust it yourself until you know what it is. We collect a lot of data and we need to show people a reasonably filtered and easily understandable explanation. This should play the key role. Waking up trust is A and O." (Professional 1)*

> *"We have terribly strong organized trade unions who are afraid of artificial intelligence taking away our jobs. Even though this fear is just pointless. (Professional 3)*

Uncertainty among jobseekers and organizations often stems from the fact that they are not familiar with the process and may think that only a machine has processed the applications. At least for now, a human, usually the recruiter, is involved in every intermediate step and accepts every action. By combining human capital and machine integrity the results of recruitment can be improved. However, some interviewees thought that in the future, AI might be utilized in a larger part of recruitment or even to manage the recruitment process completely. The future of AI in recruitment strongly depends on how the use of AI will be restricted through laws and regulations.

> *"Artificial intelligence is not necessarily the one who decides, but the one that supports the human decision. It can facilitate the activity of a group, analyze data, provide consents and background information. We are combining the calculation of the machine and the human skills." (Professional 1)*

> *"In recruiting and artificial intelligence, it raises doubt among people, when they think that artificial intelligence has dealt with their application. People do not know enough that there is always a person in between. When people don't know the process in the background it raises mistrust. Awareness will broaden their perspective." (Professional 3)*

On the other hand, some of the interviewees thought that we lose the potential of AI if there is always a person who makes a subjective decision at the end. If the purpose of utilizing AI in recruiting is, for example, to increase objectivity, it cannot be realized if the decision-

making of AI is not trusted. In practice, an accurate algorithm and AI system has been created to eliminate subjectivity from the recruitment process, but in the end, subjectivity makes the ultimate choice and therefore, the benefit of the whole intelligent system suffers. As a result, some interviewees felt that it is necessary to use the full potential AI gives to the recruitment process and not just a fraction of it.

4.6.3 Potential risks of discrimination

The use of AI in recruitment processes has given rise, in particular, to talk about potential risks of discrimination. According to the interviewees, AI can even increase diversity and reduce discrimination during the recruitment process. The potential discrimination caused by AI was probably the theme that caused the most divergent opinions. The interviewees often felt quite strongly that either AI increases diversity or causes discrimination. In addition to this, when it came to the discussion of discrimination and AI, the accuracy and validity of the algorithms and data nearly always emerged. Those who were certain that AI increases objectivity during the recruitment process were precise that the validity of the algorithms and data was mentioned. Thus, they saw huge potential and the ability to more objective recruitment if AI functions properly. The reason they thought that AI makes recruitment more objective was that when an algorithm is making the decisions, the subjectivity of human beings is removed from the equation.

The purpose of a recruitment process is to be as equal and objective as possible, offering equal opportunities for every applicant. This equality is often difficult to implement even if it is focused on. The subjectivity of a recruiter always influences their choices, even if they are trying to be as objective as possible. It is natural that the recruiter's own values, worldview and mindset guides their decision-making, but in recruiting it is not always the best course of action. AI could bring to this elimination of subjectivity in recruitment, if conducted accurately. To make AI work in the best possible way, the interviewees reminded that both the algorithms should function accurately and also the data must be cleaned and neutral.

> *"On the other hand, when implemented correctly, diversity can be increased. Specifically, it is more objective than human." (Professional 2)*

"It is essential to talk about these and clean the data well. I think that by doing the right thing we can improve things and possibly even reach a lower level of prejudice." (Professional 1)

General discussion on AI often takes the view that algorithms might be erroneous since they are in the end developed by humans. Criticism towards this point of view has, however, arisen during the interviews. The biggest problem might be that the data may be distorted. This data distortion leads to the fact that even though algorithms may be correctly formed, data can cause discriminatory decisions. This area aroused much discussion among the interviewees. This problem was found to be quite difficult, since it can be very hard to clean the data. As AI is taught on the basis of human-made decisions, the data is pretty much always distorted from the start. Data neutrality is therefore likely to pose major challenges when teaching AI.

"The fact that it is a man-made algorithm, is not the problem, but it's the data that can be distorted. The algorithm itself is neutral but data may not be neutral." (Professional 1)

Also, correlations in data can be found nearly in any case when looking at a sufficient amount of data. The question is how can these false correlations be avoided? How can the data be cleaned in a way that all relevant information remains for the examination of AI? One interviewee reported that a statistical correlation was found that the best coder is found from the house number 17 C. AI can learn to find correlations from almost anywhere and this can evolve into a big problem. It can be quite difficult to track how algorithms find the correlations. For this reason, many interviewees pointed out that AI and the decisions it makes should be considered with a critical eye. In addition, it is necessary to define precisely which information AI needs to pay attention to.

"Even if you delete age and sex of the data a 50-year olds CV will look different compared to a 30-year-old. The question is, how is discrimination avoided? For example, board members usually consist of more men than women. How can we avoid the machine of learning these kinds of correlations? We may be able to avoid negative correlation by removing names and genders, but we do not know whether the artificial

intelligence finds something that correlates negatively. For example, if the CV mentions a hobby of knitting, it can have a statistically negative effect if an average member of the board does not knit." (Professional 1)

When we are talking about AI that is taught to mimic human activity, how do we know that AI is not only repeating erroneous decisions made by human? AI is based on existing data and decisions made by human beings; therefore, it is very likely that mistakes will arise that cause some kind of discrimination. This question also raised eyebrows among the interviewees and some were even highly concerned.

4.6.4 Role ambiguity

A recruitment process often involves multiple people. According to the interviews, the responsibilities and roles of the recruiter and recruiting executives vary quite largely. The division of roles and responsibilities is particularly important when AI is included in the recruitment process, according to some interviewees. For executives and professionals who are not familiar with AI, it appears to cause some kind of headache. In the recruitment process, the ambiguity of one's own role may be questioned when a machine is doing part of the job. According to the interviewees, the transparency of the recruitment process can ease this uncertainty and role ambiguity.

"Executives are a bit nervous about artificial intelligence and therefore are a bit anxious about using these systems. They are thinking about what they can do within the artificial intelligence system so that they don't interfere with the program? Those who are not HR professionals, but substantive experts and supervisors are nervous about their role and what they dare to do in these artificial intelligence systems." (Professional 3)

4.7 The future prospects of recruitment and HR field

In the future, AI was hoped to work as a certain kind of consulting partner to the recruiter at least according to a few of the interviewees. In such a case, AI could for example, indicate

what kind of background experience in this particular task has worked previously and offer ideas but also question the decisions made by the recruiter. In this case decision-making would remain in the hands of the recruiter, but also the objectivity and analyticity of AI would be utilized in the recruitment process.

> *"I would like AI to become a recruitment partner for the recruiter. A partner who would make sure that you can do better, by making suggestions and question your decisions. You could stop for a moment and think whether this is the right decision. I don't want AI to take away my decision power." (Professional 7)*

Artificial intelligence may also provide new tools for future job searching, according to the interviewees. These intelligent tools can help organizations find the right match for their work community and also, in a reciprocal way, the job applicant is able to consider the organization's suitability to their life and values. An idea of a working life Tinder, came up in a few interviews. Finding the right match was emphasized for both parties. It is important that both the employee is a fit for the work environment and that the work environment pleases the job seeker.

> *"Artificial intelligence will bring work life Tinder's. That is to say, you will find the right work match with a sense of substantive competence, personality, motivation, value and attitudes. And it will be much easier. I believe that the time used in recruitment will be further reduced. Sure, you need to spend time planning resources and think about what kind of talent you need to recruit. The application and search phase will be further reduced." (Professional 3)*

New technologies and changing trends have led to a shift in working life. New technologies will allow us to look at future trends and also guide passive jobseekers to the right career paths if their work in their current field is likely to disappear over the next few years. These types of aids were considered to be very important in the future, where work is likely to transform continuously. People need help in the work field even though they might not even be actively looking for new work. Using new technologies to study these trends may possibly reduce unemployment when certain jobs are replaced with new technologies.

"We live in the transformation of working life. Recruitment tools help facilitate this change what will happen when work tasks change. And that's why we have to talk about what the algorithm does and how to get the job changed proactively so that no one else takes our jobs. Because of this, the future of artificial intelligence in recruiting is extremely critical. A tool is needed for a job seeker, where the algorithm can not only suggest the job but also the appropriate training for the job wanted." (Professional 1)

Just like people are regulated, the interviewees were quite certain that AI will also be regulated by laws, as the decision-making and activity of AI is comparable to human activity. Some of the interviewees saw that the activity of AI might be limited to a very minimal area, so its entire potential is not exploited. The reason for the regulation and restriction was defined by the fear of AI threatening our society. However, the fear was mainly a horror image painted by the media, which is unlikely to happen.

"I believe that there will be regulations that ban automation in some things. Regulation prohibits people from being replaced by devices in some cases." (Professional 2)

"If at some point artificial intelligence can handle the recruitment process completely, what is the significance of HR's substantive knowledge? Regulations will certainly come because if people are regulated and restricted by law and regulations, so why wouldn't artificial intelligence be? I believe that artificial intelligence will be regulated because otherwise it will most likely threaten our society." (Professional 3)

When it came to new technologies and recruitment in the future, it was hoped that we don't even know what new technologies are capable of in the future. For most of the interviewees, it was difficult to predict the future of new technology-based recruitment tools, as technological developments are so rapid this day. All of the interviewees believed that the world will look totally different over the next five years, regarding to technologies. But the question of what it will look like, was much harder and they were not able to answer the question.

"I hope that I can't even imagine what new technologies are capable of doing in the future." (Professional 7)

5 DISCUSSION AND CONCLUSIONS

5.1 Theoretical contribution

The aim of this study was to understand how new technology-based recruitment tools are utilized among Finnish recruitment professionals. In addition, the question of how the opportunities and risks that new technology solutions provide in recruitment processes are experienced by Finnish recruitment professionals was examined. Also, the future prospects of technology-based recruitment were researched.

The results are presented by highlighting the key themes that appeared in the interviews. Through these themes the current state and the future expectations of the phenomenon of new technology-based recruitment methods in Finnish organizations is described. Since the phenomenon still remains particularly new, the results aim to widen knowledge about the potential and risks of new technologies utilized in recruitment. It is vital to look at the phenomenon objectively with a critical eye, also taking into account the other side of the coin. The research objectives always guide the methodological choices of the research (Hirsijärvi, Remes & Sajavaara, 2013, 137).

Research typically starts with an observation or a need for knowledge and the research paper advancing from known to unknown (Schwegler & Shamoon, 1982, 821). Research should always aim to provide and produce new knowledge about the phenomenon (Balakumar & Inamdar & Jagadeesh, 2013). The aim of this research was to understand and increase understanding of how new technology-based recruitment tools are utilized in recruitment. In addition, the question of how the opportunities and risks that new technology solutions provide in recruitment processes are experienced by Finnish recruitment professionals was examined. Also, the future prospects of technology-based recruitment were explored.

To extend the understanding about new technology-based recruitment methods the theoretical framework of the research was collected from several sources, trying to find versatile literature about the phenomenon. These versatile sources enabled a neutral approach to the phenomenon. The discussion about the theoretical contribution is structured by presenting the three research questions, which aim to examine the observations of this study in relation to the previous research.

Research question 1) How are new technology-based solutions utilized in recruitment processes?

The answer to the first research question was approached by searching and analyzing the interviewees' user experiences of new technology-based recruitment methods. As revealed in the literature, new technologies have become a part of everyday life in recruiting (Anderson, 2003, 130; Dhamija, 2012; Searle, 2006, 336–337). These new technologies have come to assist in the recruitment process with the aim of accelerating and facilitating the recruiter's work. Considerable changes have occurred in the technologies used in recruitment and a well-functioning recruitment system that enables the entire recruitment process to be carried out is already a basic assumption today, rather than a luxury element. When talking about traditional technological developments regarding recruitment, both the literature and the interviewees were unanimous that technologies have come to facilitate the life of the recruiter and made recruiting easier for job seekers and recruiters.

When carrying out a recruitment process in one system, the management of the entire process has become less painful. One system eliminates the risk of forgetting individual job applicants, and also helps with internal communication within the organization during the recruitment process. According to the literature and interviews a lot of routine work on recruiting has been reduced as a result of electronic recruitment (Dhamija, 2012). Publication of job posts on the Internet, receiving job applications electronically and the use of electronic recruitment tools, such as various types of resume- and application banks are truly constructed to help recruiters and without these tools recruiting would be troublesome and time-consuming to a high degree (Panayotopoulou et al., 2005, 279–280). Without these efficient recruitment systems enabled by technologies it would be virtually impossible to process the huge masses of applications organizations receive due to online recruitment (Reingold et al., 2000).

New technologies provide advantages in means of gathering information from multiple sources and managing the volume, storage, indexation and access. Especially the recruitment process is considered to be an area where tools of surveillance are perceived as attractive for employers. (Searle, 2006, 337–338.) The interviews revealed that the three essential processes of recruitment and selection: attraction, search and assessment have all been influenced by technologies. All the improvements mentioned in Searle's (2006)

research were seen as significant advantages in the eyes of the interviewees. In attraction perhaps the most significant change was the movement from traditional paper-based recruitment brochures to recruitment job boards, that allow organizations vacancies more visibility and in turn, applicants have a wider range of vacancies to choose from (Searle, 2006, 339). In turn, easy access to potential applicants and identifying passive job seekers are notable improvements that technologies provide in the search process (Searle, 2006, 340). In assessment, screening applicants and diversity in applicants are also seen as progress in recruitment provided by new technologies (Baron & Austin, 2000; Searle, 2006, 342–345).

Traditional technological changes in recruitment, such as the emergence of effective recruitment systems, did not cause any disagreement among the interviewees nor in the literature. However, the same cannot be said when talking about the use of the latest technological solutions in recruiting such as big data analytics or AI. In the literature, disagreement about these new technologies occurs among researchers and yet no unity has been found (Bâra et al., 2015; McLean et al., 2015; Stuart & Norvig, 2016). Naturally, the use of these new technology-based recruitment methods also caused disagreement among the interviewees. Since the phenomenon of utilizing big data analytics and AI in recruitment is relatively new and yet so far little researched, literature about the phenomenon was viewed critically.

According to Scholz (2017, 75–76) big data is exploited in recruiting, for example in candidate search efforts, candidate communication, recruiting hidden talent and employer branding. According to the literature, AI techniques can be applied in employee recruiting, for example, by automating the process of resume identification (Kaczmarek et al., 2005, 4), recognizing personality and acquiring personality models (Furman et al., 1999), interpreting personality and compatibility to the job from an application letter (Mairesse et al., 2007, 491), communicating with humans (Stuart & Norvig, 2016, 860). These opportunities of new technology-based recruitment methods were also identified among the interviewees.

When it comes to AI, in Finland, there are pioneers and also reluctant organizations who do not want to deviate from their traditional activities in addition to the one's in between. Based on the research material, Finnish organizations utilize AI in their recruitment process at least

to some extent. Finnish companies use artificial intelligence mainly through an external service provider from which they have purchased their recruitment system. During the interviews three key phases of the recruitment process where AI was utilized, or at least could be utilized, were identified.

First, the automation of routine job tasks during the recruitment process was perceived to be self-evident. According to Dhamija (2012) a lot of routine work on recruiting has been reduced. Manual work tasks, such as administrative tasks and practical arrangements of a recruitment process were experienced as one of the best features of utilizing AI in the recruitment process. Automating routine tasks is less expensive and leaves time for more creative and non-routine occupations (Nilsson, 2005, 73; Ford, 2013, 37–39). The general belief was that in the future more and more tasks can be automated as was evident in the literature (Ford, 2013, 38).

Second, AI can be utilized in pre-screening and pre-selection of applications. If AI was capable of screening applications, it would significantly reduce the recruiter's time on prescreening. According to Kaczmarek et al. (2005, 4) AI techniques can be applied in pre-sceening by extraction of relevant information. Going through applications was listed as one of the most time-consuming processes during the recruitment process. The use of AI in reading applications raised a great deal of discussion and opinions during the interviews. During pre-screening the job description and requirements largely seen to affect whether AI can be utilized. Perhaps in jobs where the job description is quite universal, such as customer service, and where large masses are frequently recruited, AI could be utilized in pre-screening candidates. Even though, Mairesse et al. (2007, 491) predicted that personality and compatibility to the job can be interpreted by AI, the interviewees felt that measuring culture-fit and compatibility for more demanding tasks is currently nearly impossible. Today, AI, as a pre-screening recruitment tool, appeared to be an uncertain pre-screening tool, that has not yet been scientifically proven to be a well-functioning concept. Most of the interviewed recruiters were not ready to hand over the decision-making to AI in pre-screening the applicants.

Third, communication with job applicants was also seen as one of the most time-consuming recruitment processes and keeping the job applicants up-to-date during the recruitment process was seen as a great benefit of AI contributed communication. Nowadays, job

applicants want to be up-to-date with the recruitment processes and are more impatient, which is why outsourcing basic informative communication to AI was of interest. For AI to understand natural language authentically there is a demand for an empirical investigation of actual human behavior, which turns out to be very complex (Stuart & Norvig, 2016, 918). Communication does not come naturally to algorithms or AI, which is why the production of clear and manlike communication was felt to be difficult to AI. Therefore, every message generated by AI needed to be approved by a person, which meant that time was spent on monitoring the system and proofreading the messages generated by the system.

Research question 2) What kind of opportunities and risks do new technology solutions generate in recruitment processes?

As well as in media and the minds of people, one of the biggest worries concerning the arrival of AI was the concern of losing our jobs to automation, as stated in the interviews and in the literature (Stuart & Norvig, 2016, 1034). In general, according to the interviewees, Finnish people do not have a great deal of knowledge about algorithms, AI and how they work. This was the main reason why they thought that people in most cases fear the arrival of AI. In addition, trade unions and the media have created an atmosphere in which AI will take on all of our work, which is a prediction that will most likely be overturned.

Amongst the field of researchers, the effectiveness and opportunities that HR analytics provide are controversial, some advocating the issue and some arguing against it (Dhamija, 2012; Bâra et al., 2015; McLean et al., 2015; Stuart & Norvig, 2016; Scholz, 2017). As in the literature, the opinions of the interviewees also varied strongly about the phenomenon. Even though new technologies promise to make HR management more efficient, accurate and objective, Stone (2015, 1) pointed out that research on the effectiveness of digital HRM is not yet sufficiently comprehensive (Zang & Ye, 2015, 41). These new technologies, for example algorithms and AI, in the opinion of most interviewees, are still not sufficiently sophisticated, there being plenty of room for development. As a result, the opportunities that these new technologies provide in recruitment were partially questioned.

As Nadimpalli (2017) said, as generally in most things, AI also has its share of benefits and risks. Therefore, the use of AI in recruiting has naturally caused a lot of discussion among the recruiting professionals. The reasons for the use of AI in recruitment appeared to be quite similar. AI was considered to accelerate and enhance the recruitment process. Opinions did differ as to whether AI facilitated the workload of a recruitment process or increased it. Some found that AI had considerably reduced the workload, while others felt that with AI the workload increased because they could not rely on it and that in turn, leads to increasing monitoring tasks.

As previously said, today AI is utilized in three key phases of the recruitment process: practical organizing, pre-screening applicants and communication with candidates. Evidently, the use of AI at each of these phases includes its advantages and disadvantages. Of these phases, when it comes to the practical organizing, these routine job tasks the interviewees were willing to hand over to AI, without hesitation. These routine and practical organizing tasks do not require human intelligence, so they can be automated without a doubt (Ford, 2013, 38). An obvious benefit is that automating these tasks will free time from the recruiter for more challenging tasks and in addition, it is cheaper (Nilsson, 2005, 73; Ford, 2013, 38). The interviewees expressed that a surprisingly large amount of their time at work is spent on routine job tasks, so the automation of them would release a considerable amount of time to more demanding work tasks.

Pre-screening applicants, on the other hand, raised a great deal of discussion. Some were fully convinced of the benefits of AI pre-screening applications as it does undoubtedly speed up the process. But does it guarantee quality? Also, the fact that AI does not understand randomness and human irrationality, it can only pre-screen applications in a simplified way. Human irrationality, as a form of intuition, is always involved in recruitment and plays a major role in decision-making (Highhouse, 2008, 336; Miles & Sadler-Smith, 2014, 606; Cert & Wilcockson, 1996, 667; Vaahtio, 2007, 110). If eliminating irrationalities and avoiding becoming irrational is the objective of AI, how does this objective function in recruitment, where intuition is a part of decision-making (Omohundro, 2008, 487–488)? Distrust was also caused by the fact that the service provider defines the information that the AI examines. A point worth considering is also the question that whether a recruiter can even identify which parts of a CV or cover letter are significant in providing a good and potential image of the applicant? Can AI even be taught correctly if a recruiter is looking

for a good overall picture, and not just certain details. In jobs where the job description is quite universal and where large masses are frequently recruited, AI could be utilized in pre-screening candidates, since the amount of data is larger (Banko and Brill, 2011).

According to the interviews, communication proved to be difficult in Finnish, at least to some extent. As communication doesn't come naturally to algorithms, this was somewhat expected (Stuart & Norvig, 2016, 918). Part of the interviewees felt that they had to do extra work due to the messages generated by AI. Each message had to be proofread and possibly even completely rewritten. The interviewees were aware that Finnish language is not the easiest one and believed that communication would probably be more fluent in English. Candidate communication was considered to be particularly important as is has a direct impact on the employer image, according to the interviewees. Partly because of this, communication was not seen easy to outsource to AI.

According to the literature, technology and digital means of analyzing data help make decision-making more objective, which is virtually impossible with traditional judgement and decision-making including at least some degree of subjective perspective (Bondarouk & Brewster, 2016, 2660). Opinions of the objectivity of AI aroused the most divergent opinions among the interviewees. Some of the interviewees were certain that AI increases objectivity if the algorithms and data were accurate. Hence, they saw huge potential and the ability to more objective recruitment if AI functions properly. The reason they thought that AI makes recruitment more objective was that when algorithms are in charge of the decision-making, the subjectivity of people is removed from the equation as Bondarouk and Brewster (2016, 2660) highlighted in their study.

On the other hand, recruitment is a difficult task to measure, because decision-making in recruitment is almost always based on some level of subjectivity. The subjectivity of a recruiter always influences their choices, even if they are trying to be as objective as possible. Therefore, granting decision-making to AI might lead to undesirable results in recruitment (Stuart & Norvig, 2016, 1035). For this reason, some of the interviewees doubted the objectivity of AI, as it has been taught based on the human decisions made in history of recruitment. Does AI only repeat the human decisions in recruitment and thus only reinforce, for example, discrimination in recruiting? On the other hand, some of the interviewees thought that we lose the potential of AI if there is always a person who makes

a subjective decision at the end. If the purpose of utilizing AI in recruiting is to, for example, increase objectivity, objectivity cannot be realized if the decision-making of AI is not trusted.

One of the biggest problems experienced by the interviewees and also in the literature, was that data distortion lead to the fact that even though algorithms might be correctly formed, the distorted data might cause discriminatory decisions. In a country of the size of Finland, the labor market is relatively small and, therefore, also the amount of data is small. The best results are achieved with larger amounts of data, as Banko and Brill (2011) found in their research. As a result, data neutrality and quantity adequacy are subjects that need to be taken into account if AI is to be utilized in recruiting to an increasing extent. It is also important to note that while big data and AI are developing as fast as they work, understanding them remains profoundly limited (LaFrance 2015, Adams in Byrnes 2016).

Research question 3) What are the future prospects of technology-based recruiting?

The future is difficult or even impossible to predict. People's perception of life and work may change with new technologies, but according to the interviewees the basic needs of people are not changing anywhere. Looking at the future and AI, two extremes were identified during the interviews. *One extremity* represents utilizing AI in recruiting only up to certain limits, meaning that the use of AI will be regulated to a very minimal extent. When considering the problems that AI might pose, such as people losing their jobs to automation, AI leading to undesirable behavior and the success of AI meaning the end of the human race, the interviewees were quite certain that AI will be regulated (Stuart & Norvig, 2016, 1034; Müller, 2016, 2). Just like people are regulated, the interviewees were quite certain that AI will also be regulated by laws, as the decision-making and activity of AI is comparable to human activity. On the other hand, *the second extremity* was of the opinion that, the full potential of utilizing AI in recruitment cannot be achieved if it is regulated. Some of the interviewees saw that if the activity of AI is limited to a very minimal area, so the entire potential of AI is not exploited. But if AI is able to handle the recruitment process completely, what is the significance of the recruitment professionals substantive knowledge? Generally, the interviewees did not think that new technologies will take away our jobs, but instead release time for more meaningful work.

The tools of future recruitment were troublesome to predict, but the interviewees did have some hopes related to them. It was predicted by the interviewees and the literature that technologies will become smarter and play a progressively more important role in the field of technologies (Hussain, 2018, 838–841). The professional recruiters hoped to get a certain type of consulting partner from AI, that would help recruiters in for example statistical analysis and also question the decisions made by the recruiter. It was anticipated that people and machines will be working together to a greater extent and learning from each other in the future and as a result HR development and AI will most likely merge into one function (Scholz, 2017, 150). The view that people and machines work together to provide the best result was quite common among the interviewees. Technologies can possibly determine better outcomes and enable faster decision-making when it comes to recruitment, but the belief that a human being is still required in the process remained relatively obvious (Kaczmarek, Kowalkiewicz & Piskorski, 2005, 4; Faliagka et al., 2012, 216–220).

New technologies can provide new tools for future job searching, according to the interviewees. These intelligent tools can help organizations find the right match for their work community and also, in a reciprocal way, the job applicant is able to consider the organization's suitability to their interests and values. These computer-supported job matchmakings can be implemented in various ways, for example by utilizing learning-based techniques and genetic algorithms. (Montuschi et al., 2014, 41). This type of recruitment tool might reduce the application and search phase according to the interviewees.

New technologies and changing trends have led to a shift in working life. These new technologies allow us to look at future trends and also guide passive jobseekers to the right career paths if their work in their current field is likely to disappear over the next few years (Varian, 2014, 5). These types of aids were considered to be very important in the future, where work is likely to transform continuously. When it came to new technologies and recruitment in the future, positive expectations existed among interviewees that we don't even have a clue what new technologies are capable of in the future.

Naturally, predicting future is challenging. However, it is clear that technologies have already shaped recruitment and HRM as a whole. Therefore, the belief that new technologies will have a major impact in the future as well, is justified. These new

technologies bring tremendous potential according to the interviewees. At its best, new technologies can diminish discrimination from recruitment, become recruiter's trusted partners, reduce unemployment and help people with job-hunting (Varian, 2014, 5; Bondarouk & Brewster, 2016, 2660). However, it is a common truth that with great potential comes also greater risks. These risks must be seriously taken into account and viewed critically before implementation. In a worst-case scenario, technologies can increase discrimination in recruitment, take over our jobs and pose a threat to our society (Stuart & Norvig, 2016, 1035). For the aforementioned reasons, the functionality of new technologies must not be taken for granted, but instead be thoroughly investigated, according to the interviewees.

5.2 Contribution to organizational practice

In addition to the theoretical contributions, this research aims to provide new knowledge and useful information for organizations, executives, HRM professionals and recruiters. The aim of this study was not to build a comprehensive model but to rather understand the phenomenon of new technology-based recruitment methods better and also increase awareness of the phenomenon. This research is meaningful for practitioners, since thorough literature or research on the phenomenon is not available. Comprehensive research of the literature of the phenomenon and the empirical results aim to provide added value to the knowledge on new technology-based recruitment methods. The contribution to organizational practice aims to bring new ideas for recruiters, who are getting familiar with new technology-based recruitment methods and want to know what they bring to the table.

There are a few suggestions for the organizational practices that can be proposed based on the findings of this study. *The first suggestion* regards the root cause for utilizing new technology-based recruitment methods. Before implementing a technology-based recruitment method, it is necessary to consider why the product is used, what is the theory behind each technology and what are the basic assumptions of people's nature. This is extremely important when purchasing a technology-based recruitment system from external service providers. These service providers may not have worked a day in recruitment and that is why these products should not be relied on blindly. Recruitment always affects people, and that is why it is important to question the accuracy of each system and make

sure that these systems work profoundly. As recruitment significantly influences the successfulness of organizations it is vital to find quality candidates. As these new technological systems can play a major role in the future of your organizations recruitment, it is important to take care that these systems are trustworthy and operate in a non-discriminatory way. In addition, preparing to use significant time to monitor the operating of the system is important, at least in the beginning.

The second suggestion is associated with the opportunities and risks these new technology-based recruitment methods bring, in general. Critical literacy when reading literature of the phenomenon is required, but also an open mind is needed to avoid judging the phenomenon before fully understanding it. At this stage, it is hard to estimate the broader profitability of the use of new technologies in recruitment. However, over time, we will certainly have more comprehensive research data on the phenomenon. As more and more research on the subject is done, more reliable knowledge about the phenomenon is obtained. It is advisable to collect as much knowledge and information as possible about the phenomenon before taking advantage of it.

Based on the conclusions of this study, *the third suggestion* suggests that it is crucial to keep focus on the ethical, social and economic impacts of these new technology-based recruitment methods. Especially in HRM, the ethical dimension has to be considered with great caution. Weighing the real and potential ethical impacts for individuals and society is indispensable when decision-making is driven by technologies. Utilizing these new technologies in recruitment raises many ethical questions. Who is responsible in the end if decision-making is outsourced to technologies? Is the service provider held responsible or the organization utilizing the purchased recruitment system? In the end, someone has to be responsible for the decisions made in recruitment; therefore, it is important to find an answer to this question before implementing new technologies. Another interesting question refers to whether a job applicant is entitled to know who/what has handled his/her application.

Organizations must consider whether it is ethical to use information derived from multiple sources, in decision-making. Using information in unintended ways may conclude to an invasion of privacy. Data protection issues emerge rapidly as some of the information gathered from the candidates may contain sensitive personal information, including information about their sexual orientation and health issues, according to which the

employer must not discriminate the individual against other job seekers. Background checks addressed on job seekers must be based on information that is relevant to determining whether the applicant is suitable for the particular job. The General Data Protection Regulation (GDPR) should not be forgotten either. After becoming effective it will probably lead to a situation where the amount of data that can be found about jobseekers may vary a lot. Organizations must ensure that during the recruitment process they do not operate in a way that is considered discriminatory activity. When using these new technologies, organizations may blindly and unknowingly be accused of discrimination during the recruitment process. Naturally, the aforementioned risk has its effect on the employer brand image. In the worst case, an organization can ruin their employer brand image due to utilizing new technologies, leading to a PR crisis. Therefore, the ethical dimension must always be considered.

5.3 Suggestions for further research

As the phenomenon of new technology-based recruitment methods are still relatively new, it is important to research this subject even further to form a better understanding. Like any other research, also this study has its limitations, which create interesting possibilities for future research. In general, the phenomenon could be studied much more, both in Finland and globally. This thesis concentrated only on one country, Finland. Interesting insight into the subject could be provided by further studies involving other countries and cultures.

This study was conducted with a qualitative research method, since it was important to build better understanding around the phenomenon. In order to increase the reliability of this research, another further study carried out with a quantitative research method, to generalize the results would be in place. Qualitative and quantitative research data would complement each other and give more reliable results. Taking into account the unfamiliarity of the phenomenon it was important to first gather qualitative research data on the phenomenon. Gathering quantitative data would have been difficult as the utilization rate of new technology-based recruitment methods is still relatively low in Finland. Therefore, it would have been troublesome to obtain enough comprehensive research material on the phenomenon, utilizing quantitative methods.

This study provides an understanding of new technology-based recruitment methods as a whole, focusing on better understanding of the phenomenon. The extent of the phenomenon is so great that exploring some smaller aspects of the phenomenon would bring more precise information and research results. Digging deeper into each of the introduced sub-concepts, with both qualitative and quantitative approaches would be of interest. In addition, the perspective of job seekers could be studied, to broaden knowledge about the phenomenon. It will be interesting to see where further research on new technology-based recruitment methods will focus on. As the future of recruitment will most likely be augmented by technology it is important to continue research on the phenomenon.

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ATTACHMENTS

The interview structure

Background information

Would you like to tell about your own background?

How familiar are you with recruiting?

How long have you been recruiting?

What is your current role in your organizations recruitment process?

The recruitment process

How often does the need for recruitment occur in your organization?

Who is responsible for recruiting, is there a uniform operating method?

How does your recruitment process progress step by step?

Recruitment process and technology

How has the recruitment process changed with new technologies?

Have your recruitment tools changed over the years?

Is the time spent on recruiting reduced?

What do you have the most time-consuming process for recruiting?

How have you been trying to speed up your recruitment?

Do you use data analytics or artificial intelligence in your recruitment process?

What kind of discussion does the use of artificial intelligence in the recruitment process arouse? Has there been much discussion?

What phases of the recruitment process, do you think that AI could influence?

Why did you go to different technological solutions? Why exactly this?

How did the need for such a product arise?

When and how did you start using the product?

Has there been a demand for the product?

Is it ever more accelerating?

When did you think Finns are awakened to artificial intelligence?

Risks & Opportunities

What risks do you see in the recruitment process of artificial intelligence and data analysis?

What opportunities do you see in the recruitment process of artificial intelligence and data analysts?

Have you noticed some kind of discrimination during the recruitment process when using AI?

How can we ensure equal opportunities for applicants?

People have created algorithms → errors happen → do you believe AI based decision-making is reliable? What is the risk margin?

Future of recruitment

How do you see the future recruitment process?

Do you believe that with the use of artificial intelligence, HR's responsibilities will not change, because human contact remains important? Artificial intelligence will only support the work of HR professionals.

How does HR's work field change due to artificial intelligence and data analysis? (do routine work tasks disappear?)

Do you believe that with artificial intelligence, the size of the HR department will change?

Will there be more control tasks in the HR field by monitoring algorithms and machines?

Do you believe that at some point data and automated decision-making can be fully trusted?